FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

No. 278. (No. 17, Vol. VI.)] APRIL 25, 1914. [Registered at the G.P.O. as a Newspaper.] [Weekly, Price 3d. Post Free, 3½d.

Flight.

Editorial Office: 44, ST. MARTIN'S LANE, LONDON, W.C.
Telegrams: Truditur, Westrand, London. Telephone: Gerrard 1828.
Annual Subscription Rates, Post Free.
United Kingdom ... 15s. 0d. Abroad ... ... 20s. 0d.

CONTENTS.

EDITORIAL COMMENT.

An Unnoticed British Triumph.

It is passing strange that so little attention has been given by the Press at large to the winning of the Jacques Schneider Trophy at Monte Carlo by a British seaplane—the Sopwith, piloted by Mr. Howard Pixton, which was the only one to complete the oversea course of 150 nautical miles without trouble. The Press has done so much for the cause of British aviation that it might reasonably have been expected that something more than an average of half-a-dozen lines would have been devoted to so notable an achievement, which means, if it means anything at all, that the British seaplane is now the best machine of its kind produced. We are not finding fault, for to do so would be to manifest ingratitude for all that the Press has done for the development of the science, but it is impossible to allow the matter to pass without remark, since we should have expected that so notable a performance as that of the British Sopwith would have been thought worthy of at least a little more than merely passing mention. Surely, there is more in the beating of the best machines of the seaplane type produced abroad, and flown by the best men of their respective countries than in an advertising "stunt" engineered by an enterprising daily journal, which is sending an aeroplane round the coast resorts, and over which it spreads itself daily. Not that we deny the usefulness of the aforesaid "stunt" to the industry, nor that we grudge the advertisement that the journal in question is getting out of it, particularly as it has done a vast amount for the popularization of aviation. And yet that same journal is content to confine its description of this notable British victory to the bald facts as detailed by Reuter—not a word of comment or commendation. Nor do we find in any of the cuttings from contemporaries that have reached us anything more than the Reuter report of the race, which is, to say the least, disappointing.

Ever since aviation came into being we have been accustomed to regard ourselves as lagging behind others in development—at any rate, until quite recently. With the exception of the win of the Cody machine in the Military Trials of 1912, the British-built machine has almost invariably in the big events had to be content with a record of "also ran," and the Press has not been slow to point it out. Now that we have really made substantial progress, so substantial that the tables have actually been turned, the fact apparently escapes all notice save that contained in the bare reports of results. However, so far as we are ourselves able to supply the deficiency, we will do so by tendering to the builders of the Sopwith and to Mr. Pixton our heartiest congratulations upon the splendid manner in which the combination has demonstrated the lead that the British industry has obtained in this particular branch of aerial science. May the triumph be oft repeated.

In striking contrast to the attitude of the British Press may be cited the following translation of an article in *Le Temps*:—

AFTER GERMANY, ENGLAND!

We were able yesterday to mention in our "latest news" the victory gained by England at Monaco in the race for the Jacques Schneider Hydro-Aeroplane Cup.

This classical trial, founded by the gentleman whose name it bears, at the last meeting, was run this year over a distance of 150 nautical miles, *i.e.*, 280 kilometres.

In the course of this trial competitors were required to touch water with the floats, first at the start, which had to be made from the water, and secondly twice again in the course of the first 10 miles. After that the competitors, after having passed the finishing line, had again to touch the water on the course.

We know that our French representatives, Levasseur and Espanet, have, by bad luck, not been able to finish the course. These two excellent aviators, who piloted Nieuport monoplanes, were stopped by engine trouble, but in any case their machines were not as fast as the Sopwith.

As to Garros, who is not afraid of 280 kilometres, he doubtless preferred not to start, rather than put up a performance which in his opinion could not possibly beat that of the Englishman, Howard Pixton, who had covered, complying with all the regulations of the race, the 280 kilometres, for the Schneider Cup, in 2 hours 13 seconds, which represents, taking into account the three compulsory descents on the waves, a speed of more than 150 miles per hour.

This absolutely remarkable performance had, up to the present, never been accomplished on an hydro-aeroplane; that is why this English victory is particularly meritorious, all the more so because it was gained on a biplane specially constructed by the Sopwith Company.

We have had our part of the success because the machine was fitted with a 9-cylinder Gnome Monosoupape engine of 100 h.p. the name of which may be associated with the British victory, but that is no more than half a consolation.

In the interests of our industry we must consider the importance of this victory, which will arouse great enthusiasm on the other side of the Channel. In a country where the Navy is in great honour, the triumph of an English hydro-aeroplane will be much noted.

The lessons we have learnt yesterday are that all too little encouragement has been given to maritime aviation, and that therefore our constructors have not been able to contest foreign rivalry.

The English supremacy which showed itself at Monaco yesterday is quite as important as that shown by the Germans in capturing the world's duration and height records.

It *is* possible for us to regain and keep all these trophies, but not if official encouragement is not lavishly given to our constructors.

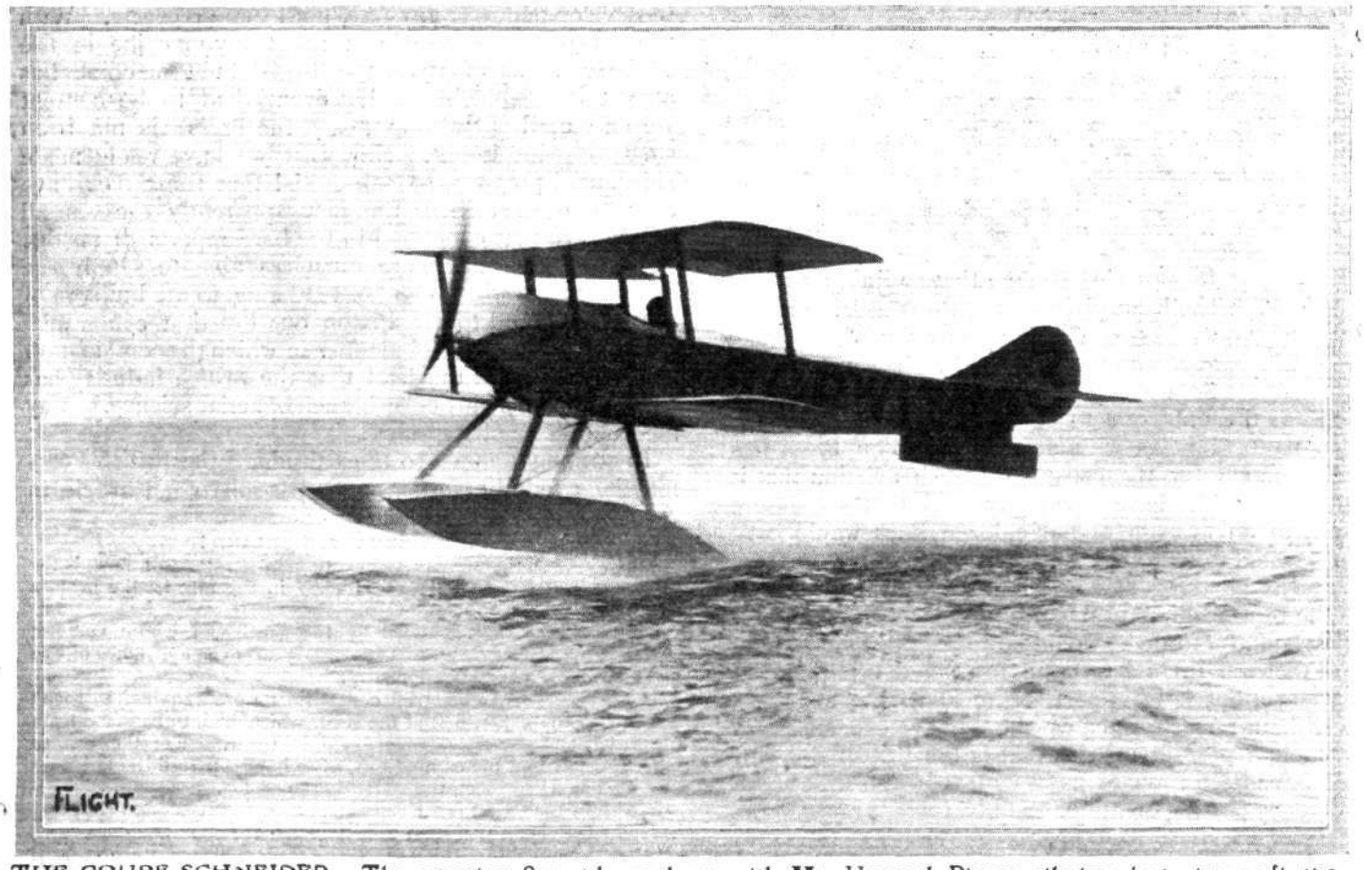
The paragraph against which we have set side rules is particularly suggestive.

❖ ❖ ❖

The Aeroplane and the Apparently Impossible.

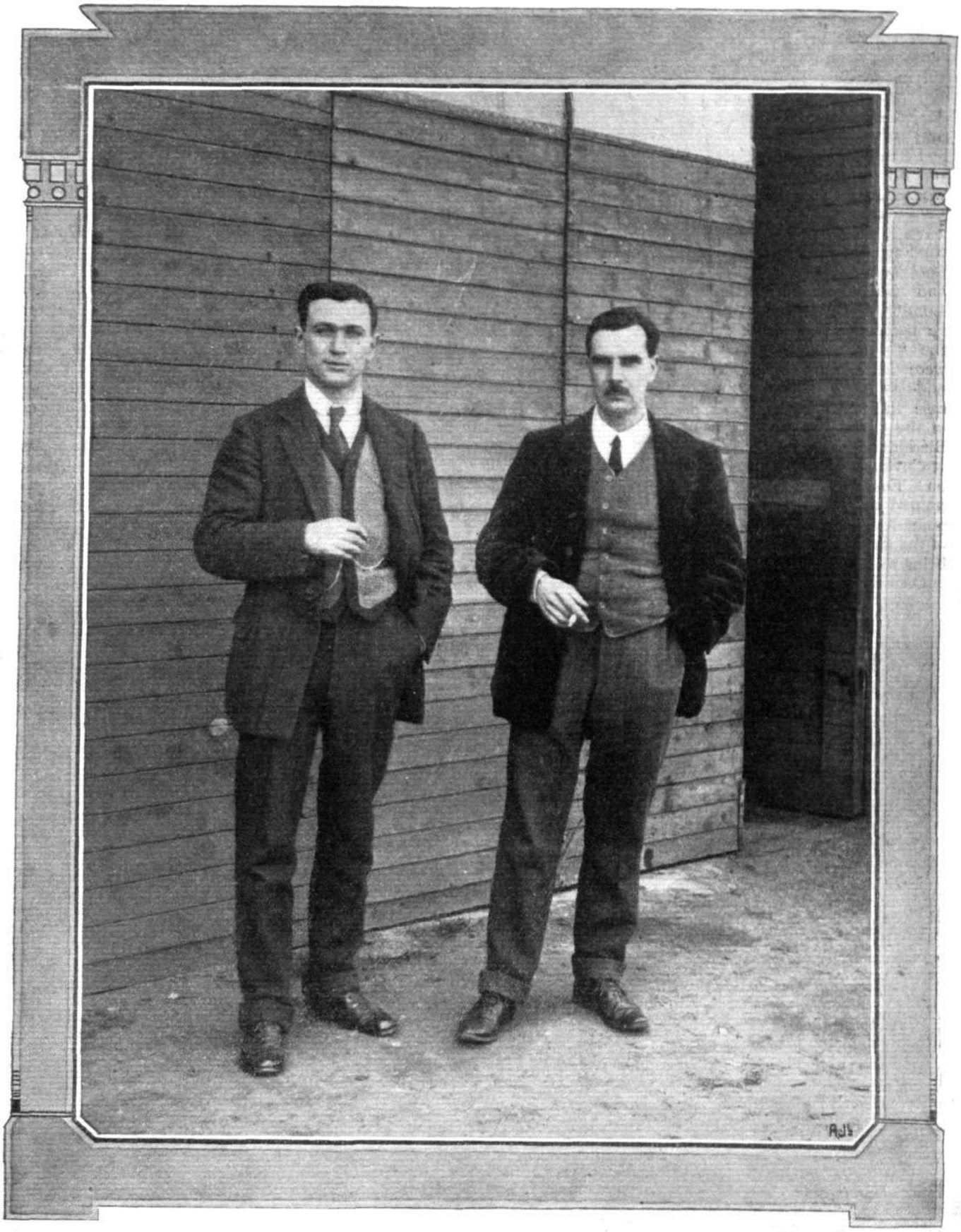
What the future effect of aviation on news service is likely to be was brilliantly demonstrated by Mr. Hucks on Tuesday last in connection with the visit of their Majesties the King and Queen to France. With commendable enterprise it had been arranged by the *Sphere* newspaper and the proprietors of the Coliseum that Mr. Hucks, with a cinematograph operator as passenger, should follow by aeroplane the passage of the Royal yacht to Calais. Elsewhere we give details of the flight in Mr. Hucks' own words, which briefly relates how leaving Folkestone half an hour after the King's departure, Mr. Hucks soon overtook the "Alexandra" and her escort of cruisers, circled about the squadron for long enough to enable the operator to secure his pictures, and then flew on to Calais where he ultimately descended and was received by the Mayor. Leaving Calais at 1.45 he was back at Hendon by 2.35 o'clock, the films being at once developed and ready for showing at the Coliseum by 4.45, enabling the pictures of the King's Channel crossing to be shown on the screen *shortly after five o'clock.*

The achievement was brilliantly illustrative of the methods of modern science, and was in particular a veritable triumph for the internal-combustion motor, which has made these marvels possible. Further than that, it was an eloquent object lesson in the use of the aeroplane for securing and rapidly transmitting information, pictorial or verbal, for the use of the Press, or, for that matter, for any purpose for which quick information is necessary. By no other means than by the employment of the aeroplane could the pictorial records of the crossing have been secured, nor could they have been transmitted with the same rapidity and certainty in any other way than through the air. It is, possibly, this last reflection which is the more important, inasmuch as speed counts for nothing without certainty. That is why this last achievement of Mr. Hucks is so enormously important, affording, as it does, eloquent witness to the fact that the aeroplane has now come to be reckoned among the methods of transit to be depended upon with at least the reasonable certainty that it will do what is intended and do it well and to time.



THE COUPE SCHNEIDER.—The winning Sopwith seaplane, with Mr. Howard Pixton piloting, just rising off the water at Monaco.

MEN OF MOMENT IN THE WORLD OF FLIGHT



MESSRS. H. P. MARTIN (left) AND G. H. HANDASYDE (right).
"The Martinsyde."

OVER THE ROYAL YACHT IN MID-CHANNEL.

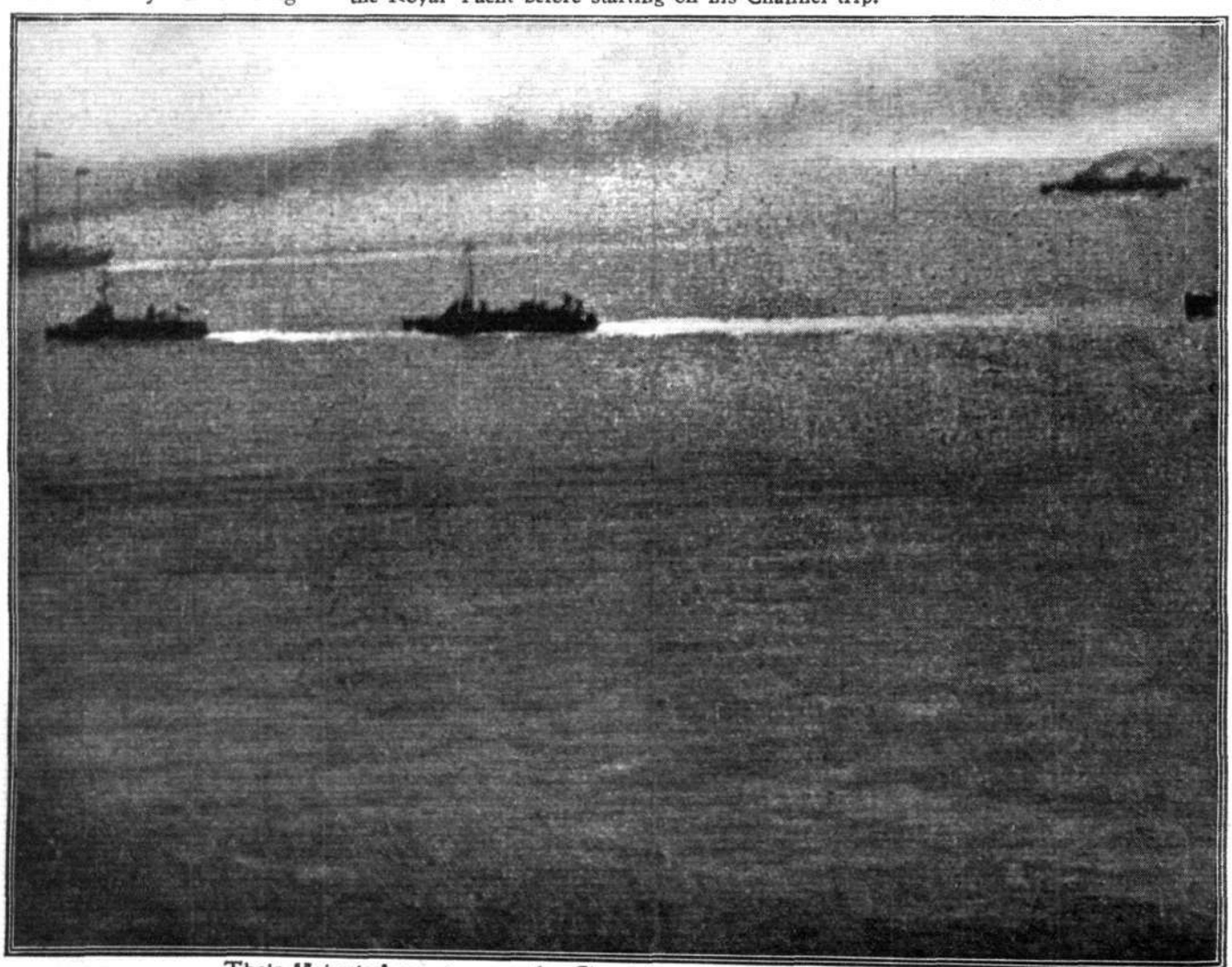
By B. C. HUCKS.

ONE of the jolliest trips I have ever made. That's how I feel about my flight last Tuesday, when I was successful in bringing to London the first pictures of Their Majesties' Channel crossing and arrival at Calais.

I first heard of the project on Friday last at 2 p.m., when Mr. Harold Perrin took my manager, Mr. J. C. Savage, and myself along to the Savoy to meet Mr. Hugh Spottiswoode of *The Sphere* and Mr. Croxton of the London Coliseum, the two gentlemen who were working the "stunt." Final details were settled on Saturday mid-day, a float procured in case the machine dropped in the Channel and my 80 Blériot two-seater packed up at Coventry where I looped on Easter Monday and trained to Folkestone, the point decided on for the start of the flight, owing to Dover being within prohibited area.

On Sunday a landing ground at Calais was chosen and a starting ground at Folkestone. The latter was a field at Capel, right on the top of the cliffs and about three miles from Folkestone. My machine arrived at Folkestone on Monday mid-day, was conveyed by motor to the ground and was erected and ready for flight by 5 p.m. I made a trial trip over the sea front at Folkestone about six o'clock the same evening, with Mr. Harold Pontefract in the passenger seat, and found everything in order. On Tuesday morning after a trial flight with the operator to get him used to his peculiar position—he faced towards the tail—I started off across the Channel at exactly 11 a.m. in brilliant sunshine and very little wind, exactly half an hour after the departure of the Royal Yacht from Dover. It took me some time to pick up the Royal Yacht as there was a considerable mist on the

Mr. B. C. Hucks at Folkestone waiting for the departure of the Royal Yacht before starting on his Channel trip.



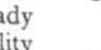
Their Majesties' escort across the Channel as seen from Mr. Hucks' Blériot.

surface of the sea, but after about fifteen minutes' flying, I noticed a haze of smoke and as this was the only sign of activity in the neighbourhood I made for it and discovered my quarry. The French cruisers had already joined the escort, and to give my operator every facility I dived down to about 400 ft. and enabled him to get a fine picture of the mid-Channel scene.

I circled the fleet completely on three occasions, being then right out of sight of land. As we were nearing Calais I hovered about and flew over Calais Harbour at the precise moment of the entry of Their Majesties' Yacht, when my photographer obtained what turned out to be a most magnificent and novel film. I then made direct for the Calais Aerodrome, flying over the town at 800 ft. I landed at 12 noon, when I was presented with a bouquet from the Mayor of Calais and also learnt that I was the first English airman to land at Calais.

The operator then extracted the exposed film which I fixed in the passenger seat of my machine together with the bouquet, and at 1.45 I started off for Hendon. I struck the English coast at the exact point of my departure, followed the railway line to Ashford, and on reaching the outskirts of London, I took last year's Aerial Derby course to Hendon, where I arrived at 2.35. I had covered the 125 miles in 110 minutes. The journey overland was a very bumpy one, there being a terrible lot of *remous* owing to the extreme heat of the sun.

On landing, the film was handed to a representative of the Warwick Bioscope Chronicle Film, and rushed off to Charing Cross Road, where it was developed, a print made, and a complete record of the King's journey from London to Calais was shown at the matinée performance at the Coliseum at 5.20. Actually, the film was delivered to the Coliseum at 4.45.



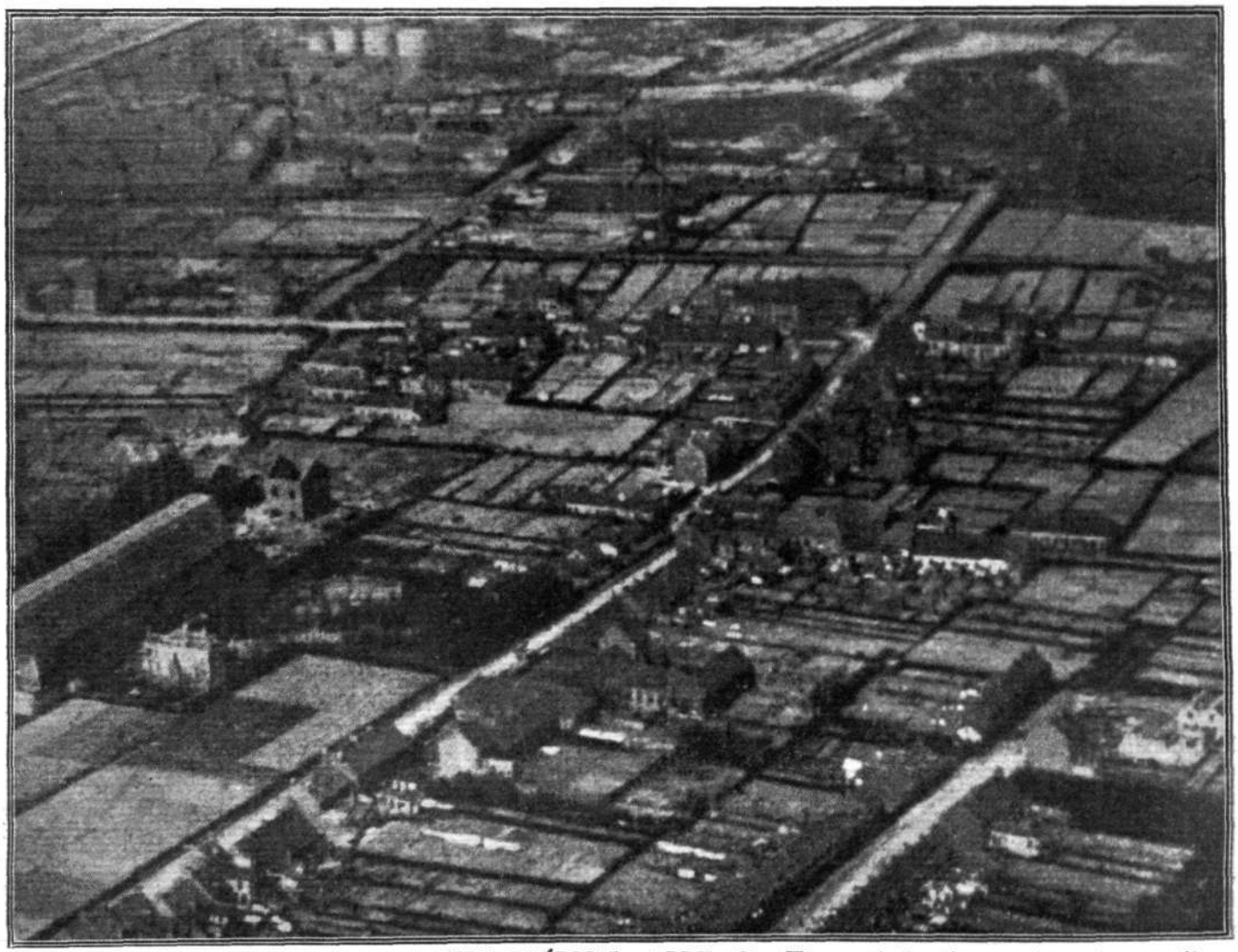
Mr. B. C. Hucks at Bristol and Coventry.

On Wednesday, April 8th, Mr. Hucks demonstrated at Horfield, Bristol, first on his two-seater, the "Tornado," when his complicated evolutions led many spectators to imagine he was looping. Mr. Hucks' "get-off" with this machine is extraordinary. After a short run, and an almost imperceptible rise of a few feet, the nose suddenly rears up, and the machine literally takes a flying leap into the air for about 50 ft. before it is flattened out. On his second trip with this machine, Mr. Hucks circled Bristol at 4,000 ft. On the "looper" seven loops were accomplished as well as an upside-down flight of half a mile.

On Good Friday Mr. Hucks again flew at Bristol before a huge and enthusiastic crowd. On the two-seater two fine flights were made, once reaching an altitude of over 7,000 ft., and being lost to view in the driving clouds. On the looper he added 10 loops to his total, and flew inverted for nearly two minutes.

On the following day, Saturday, twelve more loops were made, bringing his total of loops up to 299. Several thrilling flights were made on the Tornado, but owing to the blustery conditions, and the confined nature of the ground, no passengers could be carried, although there were many eager applicants.

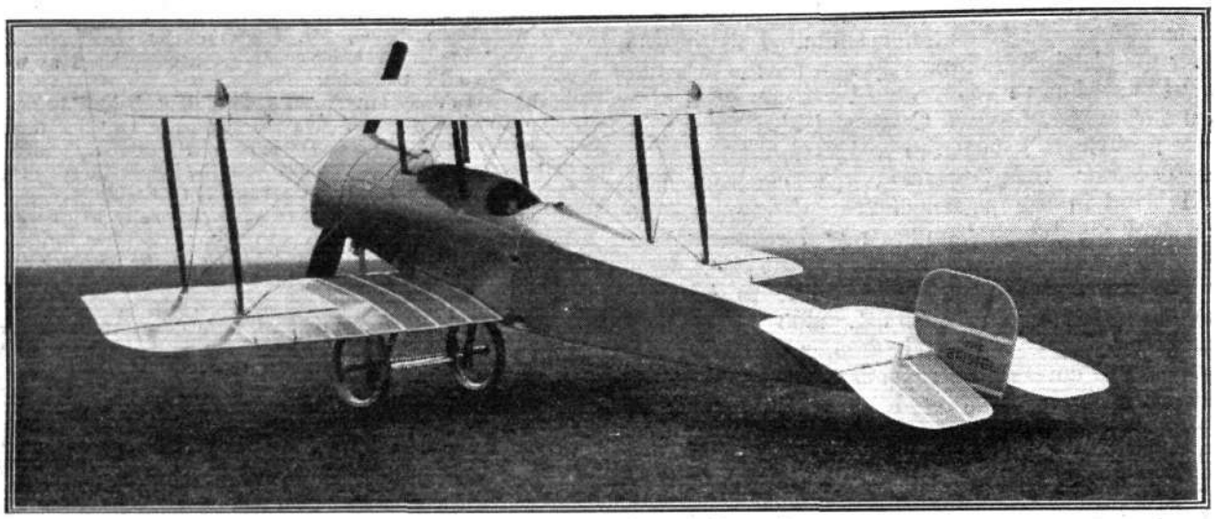
After the flights both machines were dismantled and packed off to Coventry, where, on Easter Monday, in the grounds of Whitley Abbey, Mr. Hucks gave wonderful displays before a crowd numbering fully 50,000. The feature of the afternoon was an upside-down flight of exactly 2 mins. This was against a 40-mile wind, so that at times the monoplane appeared to hover motionless in its inverted position. In the morning Mr. Hucks flew all round Coventry on the passenger-carrying machine in order to dispel a rumour that he was ill and unable to fly. Nine loops were made during the afternoon, so that Mr. Hucks has now reached and passed his three hundredth loop since he first looped at Buc last November.



VIEW OF CALAIS FROM MR. HUCKS' BLÉRIOT, APRIL 21.—This and the photograph on the preceding page were secured by Mr. B. C. Hucks on behalf of *The Sphere* and the Coliseum, the actual films being taken by an operator of the Warwick Bioscope Chronicle Film.

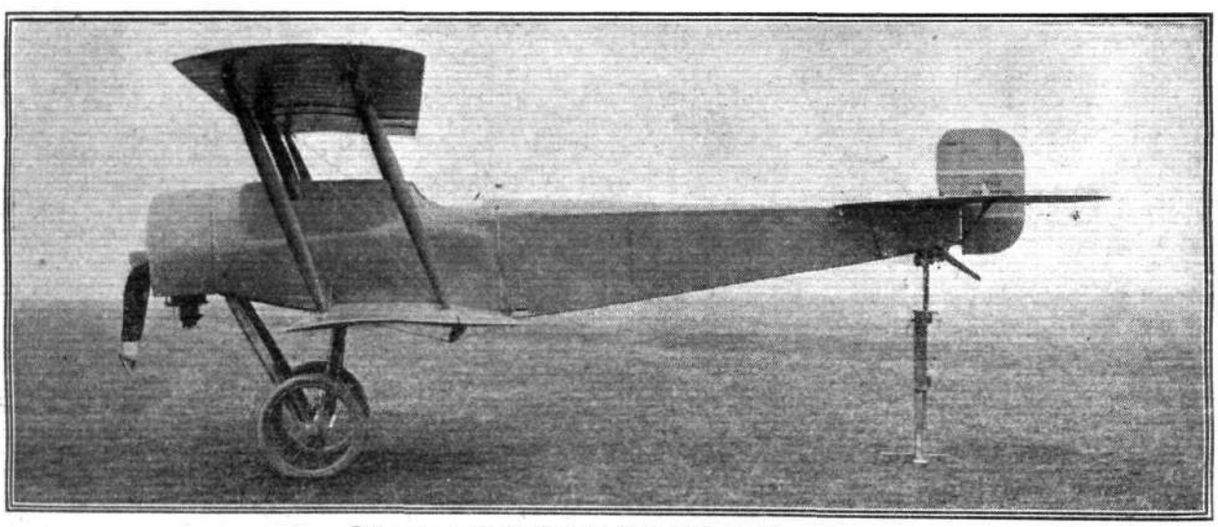
THE 80 H.P. BRISTOL "SCOUT."

IT is a matter of gratification that the best of British-built machines are now generally acknowledged to be at least equal to those produced in other countries, in spite of the scant encouragement which the British industry has received in the past. It appears that Great Britain is in a fair way to take the leadership, at least as regards a certain type of machine originated in this country, a type possessing great possibilities, which has not up to the present received much attention abroad. We refer to the small, fast, single-seater, tractor-type biplane. In France, when high speeds are desired, designers almost invariably turn to the monoplane type of machine, whilst German constructors do not appear to pay any considerable attention to really fast machines. There is little doubt, however, that the small span tractor biplane has great possibilities where, in addition to a very high maximum speed, a low minimum speed is desired, for the biplane construction allows of a considerable amount of saving in weight, whilst still retaining a reasonably high factor of safety. Evidently British constructors are realising the possibilities of this type, as, at the recent Olympia Show, three well-known English firms exhibited machines of this type. Of these machines, the one exhibited by the British and Colonial Aeroplane Co. has already proved its capabilities in actual flight. Since the closing of the Show, Mr. Harry Busteed, the well-known Bristol pilot, has done a considerable amount of flying on the machine, most notable among these flights being one made during Easter, when he flew from Salisbury Plain to Brooklands in 27 mins. Of course this flight was accomplished with the aid of a following wind, but even so it was no mean performance.

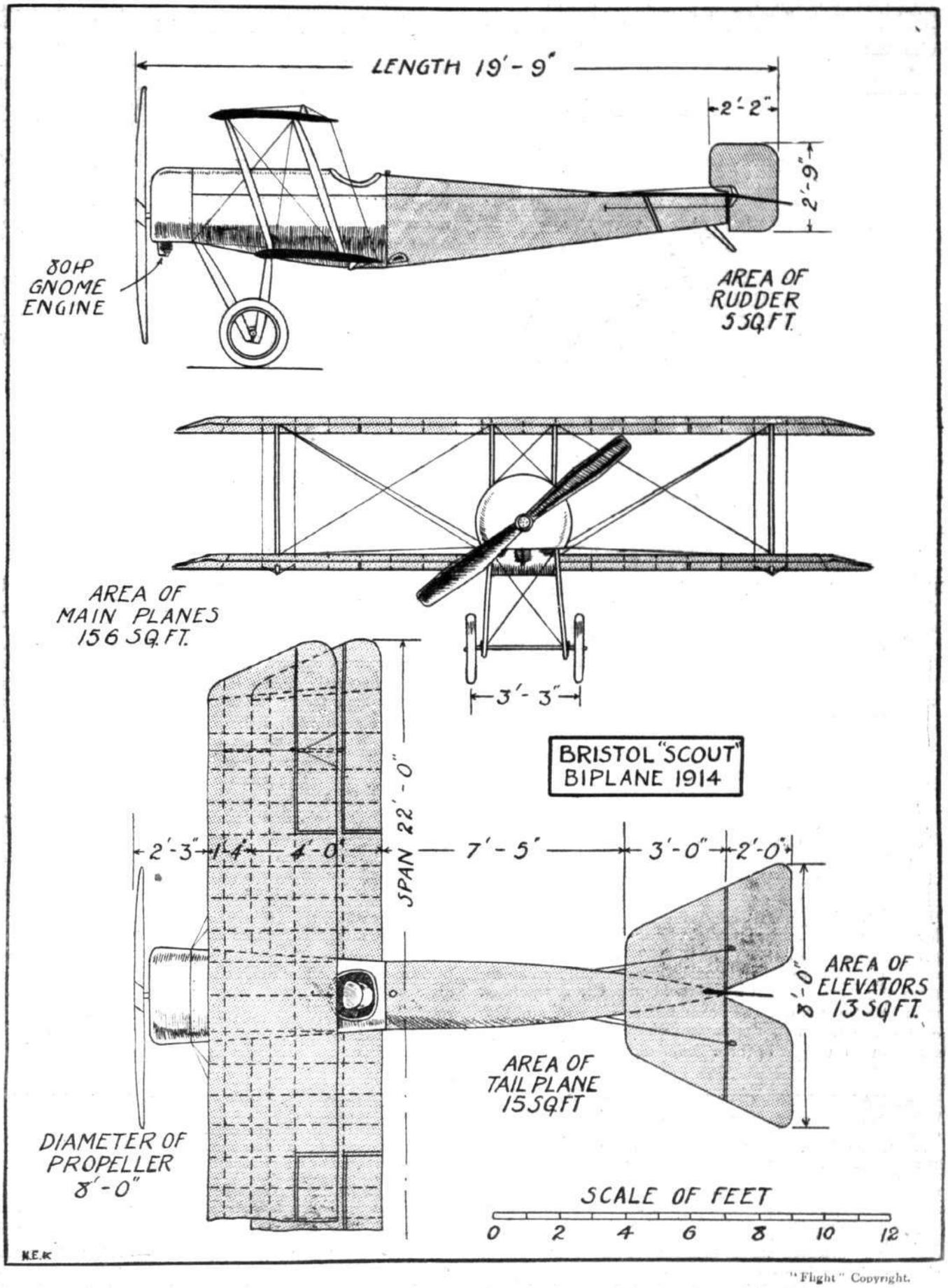


Three-quarter rear view of the Bristol "Scout" single-seater.

In the general disposition of its component parts the machine follows standard practice, having a rectangular type *fuselage*, built up of four *longerons*, which are of ash in the front portion, and spruce at the rear. Vertical and transverse spruce struts separate the *longerons*, and the whole structure is made rigid by high-tension steel piano wires attached to steel plate joints. Mounted on overhung bearings in the nose of the *fuselage* is the 80 h.p. Gnome engine which drives directly a Bristol propeller of 8 ft. diameter. An aluminium cowl almost entirely encloses the engine. This cowl appears to present a comparatively large vertical surface, and it would seem that some form of hemispherical nose-piece, revolving with the propeller as in the large two-seater Bristol biplane exhibited at the Show, might add slightly to the speed. The front part of the *fuselage* up to a

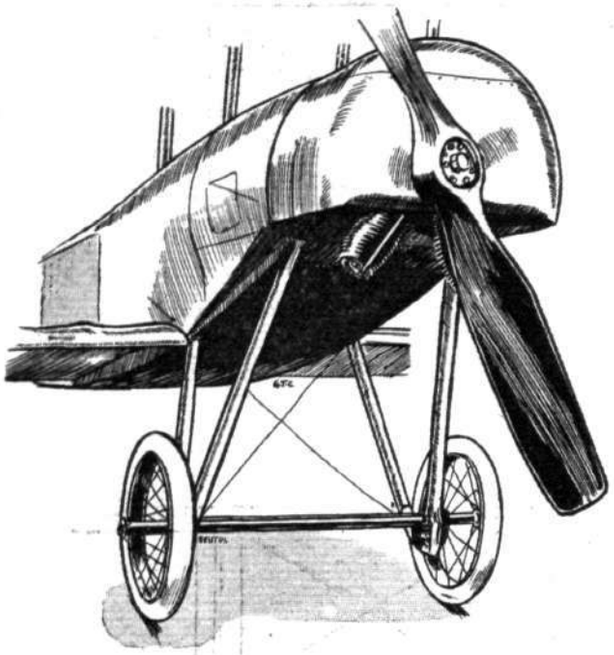


Side view of the Bristol "Scout" single-seater.



THE BRISTOL "SCOUT" BIPLANE.—Plan, front and side elevation to scale.

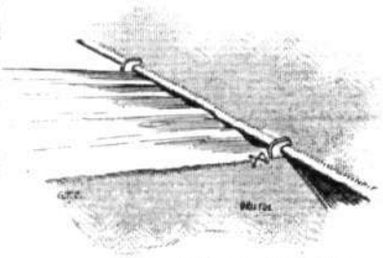
point behind the pilot's seat is entirely closed in by an aluminium covering, whilst the rear portion is covered with fabric. Just behind the inner pair of rear struts



"Flight" Copyright.

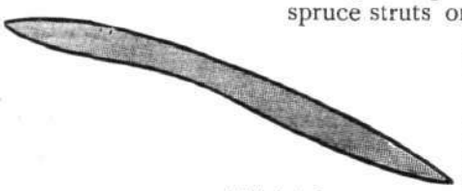
Chassis and engine housing on Bristol "Scout."

is the pilot's cockpit, in which is accommodated the seat, slung from the *fuselage* on piano wires. By means of the wire strainers incorporated in the seat suspension, the position of the seat may be altered to suit the pilot. Control is by means of a single vertical lever, which operates the elevator and *ailerons*, and a pivoted foot-bar actuating the rudder. The vertical lever terminates in a form of handle similar to those known from the Prier type Bristol monoplanes, on which is mounted the switch. Between the pilot's seat and the engine are mounted the tanks, which have a capacity sufficient for a flight of three hours' duration.



"Flight" Copyright.

Attachment of tail plane on Bristol "Scout."

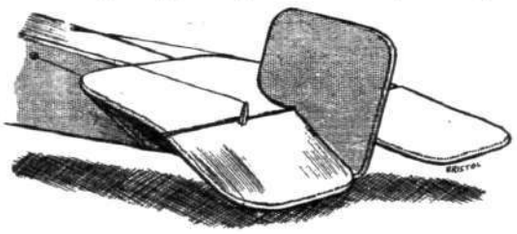


"Flight" Copyright.

Wing section of the Bristol "Scout."

Attached to the upper *longeron* at the rear end of the *fuselage*, is a flat, non-lifting stabilising plane, to the trailing edge of which is hinged the divided elevator. The rudder is pivoted round an extension of the stern-post of the *fuselage*, and is partly balanced by a small portion of it projecting forward from the rudderpost above the stabilising plane. All control cables are in duplicate and have a very high factor of safety.

The main planes are chiefly remarkable on account of their unusually short span, and on closer inspection the wing section proves to be highly interesting, as it does not resemble any of the standard sections employed by other well-known firms. As a matter of fact, the section is the same, of course to a reduced scale, as that on the two-seater Bristol machines, which has been found by the Eiffel laboratory to give an exceedingly good lift/drift ratio. This wing section was, as our readers are no doubt aware, designed by Mr. Coanda, and is probably



"Flight" Copyright.

The tail of the Bristol "Scout" biplane.

one of the contributory causes to the high speed and good speed range of the machine. Double acting *ailerons* are fitted to both upper and lower planes, so that the machine must have ample lateral control. Internally the wings are braced by piano wire, whilst the external diagonal bracing is effected by stranded cables having a high factor of safety. Only a single pair of spruce struts on each side of the *fuselage* separate the main planes, so that there is very little head resistance.

The chassis has been reduced to an absolute minimum. Two pairs of V struts joined at their lower extremities by a transverse member constitute the rigid portion of the chassis. The tubular axle rests in the angle between the struts, from which it is sprung by means of rubber cord. The tail planes are protected against contact with the ground by means of a short skid projecting through the *fuselage* covering, and sprung inside the *fuselage* by means of rubber cord. The main characteristics of the machine are :—

Weight of machine empty	616 lbs.	Minimum speed	47 m.p.h.
Useful load carried ...	340 lbs.	Range of flight	3 hours.
Maximum speed... ...	95 m.p.h.		

⊛ ⊛

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending April 18th, 1914 :—

No. 2 Squadron. Montrose.—1,415 miles in all were covered by the pilots of this Squadron. Numerous reconnaissance flights were made from Montrose to Fraserburgh to the north, and Edinburgh to the south.

No. 3 Squadron. Netheravon.—All 3 "flights" were fully occupied with reconnaissances throughout the week. Experiments with signalling were continued.

No. 4 Squadron. Netheravon.—The Officer and N.C.O. pilots of this squadron carried out numerous cross-country reconnaissances, including flights to Gloucester, Portsmouth, Bristol and Barnstaple. 1,612 miles in all were flown.

No. 5 Squadron. S. Farnborough.—"A" and "B" flights covered 1,124 miles during the week almost entirely across country. Practice in landing in restricted areas was continued.

No. 6 Squadron. S. Farnborough.—Flying took place daily. The technical instruction of recruits who have recently joined the squadron was proceeded with.

Flying Depôt. S. Farnborough.—Besides a certain amount of flying, the squadron was fully occupied with repairs to aircraft and M.T., with the technical instruction of recruits and with assisting the A.I.D.

Headquarter Flight. S. Farnborough.—This "flight" has carried out a considerable amount of experimental work of various kinds, amongst others it has been busy with wireless, photography and kiting.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Jacques Schneider International Maritime Race.

THE Jacques Schneider Cup was contested at Monaco on Monday last, the 20th inst., when the following competitors took part :—

Espanet (Nieuport)	France.
Levasseur (Nieuport)	
C. Howard Pixton (Sopwith) ...	Great Britain.
John Carbery (Morane-Saulnier) ...	
Burri (Franco-British)	Switzerland.

The Race resulted in a splendid victory for Great Britain, the course of 150 nautical miles being completed by C. Howard Pixton on a Sopwith Biplane in 2 hours 13 secs. Of the other competitors, Burri (Switzerland) was the only one to complete the course.

Mr. G. Holt Thomas, Mr. Harry DelaCombe, Lieut. C. L. Courtney and Mr. Harold E. Perrin (Secretary) represented the Royal Aero Club of the United Kingdom at Monaco.

At the presentation of the Cup on the 21st inst., Mr. T. O. M. Sopwith, Mr. C. Howard Pixton and the Representatives of the Royal Aero Club were received by the Prince of Monaco.

166, Piccadilly. HAROLD E. PERRIN, Secretary.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

EASTER Monday was a beautiful day for flying, and was greatly appreciated by the holiday makers, fully 500 visiting the grounds during the day, quite a record for Eastchurch; they were amply repaid for their visit, as some very fine flying was seen. The machines up were :—50 h.p. Caudron, 50 and 80 h.p. Shorts, Nos. 3 and 64, 65 Short, 80 h.p.; Lieut. Davis as pilot had a cross-country flight to Kingsnorth; Lieuts. Marix and Fowler made a flight to Brooklands and back on No. 27 Sopwith, 80 h.p.; 33 Sopwith, 80 h.p.; 31 Henry Farman, 70 h.p.; 36 Deperdussin, 70 h.p.

Tuesday fine, rather windy. No. 27 Sopwith 80 h.p., 104 Sopwith 80 h.p., 36 Deperdussin Anzani 70 h.p., 3 and 65 Shorts 80 h.p.

Wednesday fine, windy midday. No. 27 Sopwith 80 h.p. to Isle of Grain; 66 Short 50 h.p., Lieuts. Davis and Ireland, cross-country wireless test.

Thursday, windy. No. 65 Short 80 h.p., 10 Short 140 h.p., 36 Deperdussin, 70 Anzani, 27 Sopwith 80 h.p., Lieut. Marix to Brooklands.

Saturday, rather windy. Morning: No. 27 Sopwith 80 h.p., Lieut. Marix returned from Brooklands, 31 Henry Farman 70 h.p., 65 Short 80 h.p., 10 Short 140 h.p., 50 B.E. Evening: 50 B.E., 16 Avro 100 h.p., and 3 Shorts.

Civilian Flying.—Monday, the Hon. M. Egerton had three fine flights on his 50 h.p. Short. Professor Huntington was also up on his machine.

Wednesday, Mr. Ogilvie made his first flight on his Wright since returning from Egypt. Mr. Sydney Pickles was also out testing his Blériot 50 Anzani, taxying the grounds.

Thursday, Mr. Ogilvie out again on Wright.

Saturday, Professor Huntington had one flight.

Sunday, windy during day. Mr. Sydney Pickles was out very early on his Blériot-Anzani 50 h.p., and had a couple of fine flights before the wind arose, and had his machine in again before 9 a.m. He was also out again in the evening, and made one good flight, but the second time had to come down just outside the aerodrome owing to engine trouble. Mr. F. McClean made his first flight since returning from Egypt, taking up a lady as passenger. Mr. Ogilvie and Professor Huntington also had a flight.

Brooklands Aerodrome.

MR. LAN-DAVIS, on Tuesday last week, flew to Hendon before breakfast on his 50 h.p. Avro biplane. Lieut. Noel Humphreys arrived from Farnborough on Maurice Farman No. 322, returning there after a short stay. The Vickers and Bristol schools were at work.

On Wednesday, the Bristol and Vickers pupils were out, one of the latter, Mr. Hinshelwood, making a nice flight on the 50 h.p. Vickers-Blériot monoplane. Lieut. Stoddart, of No. 5 Squadron, arrived on a Maurice Farman from Farnborough, and afterwards flew back there. The Sopwith "tabloid" biplane sent back to works at Kingston for some slight alterations. Lord Edward Grosvenor's 50 h.p. single-seater Blériot monoplane arrived at Blériot works. Mr. Jack Alcock was out on Mr. Coatalen's Maurice Farman biplane. In the afternoon Mr. Busteed flew to Farnborough on the Bristol "scout" biplane. Lieut. Robin Grey arrived from Farnborough on a 50 h.p. Avro, afterwards flying back there. Lieut. Collett was out on No. 2 D.F.W. biplane, Mr. Merriam on the Bristol biplane. Lieut. de Havilland arrived from Farnborough with a passenger. Messrs. Gaskell-Blackburn and Hunt each had a flight on the former's biplane.

On Thursday morning the following Vickers pupils passed their *brevet* tests in excellent style (each rising to 500 ft. and over in the altitude tests), namely, Messrs. Victor Wilberforce, Mark Dawson, and Comte James de FitzJames. Lieut. Collett (with Mr. Gaskell-Blackburn as a passenger) flew to Portsmouth on the D.F.W. biplane, returning in the afternoon, and afterwards making half-an-hour's flight solo. Mr. Harry Busteed arrived from Farnborough on the Bristol "Scout," the machine having been officially tested to do 94 miles (high) and 44 miles (slow) per hour respectively—a fine performance for both pilot and the Bristol Co.

On Friday, Lieut. P. B. Joubert de la Ferte, of No. 3 Squadron, arrived from Netheravon on an 80 Blériot.

The Vickers and Bristol Schools were busy Saturday morning. Mr. Alcock was out on the Sunbeam-engined Maurice Farman biplane. Lieut. P. B. Joubert de la Ferte returned to Netheravon on the 80 h.p. Blériot. In the afternoon, Mr. Waterfall was flying the

Prince Leon Sapieha, who passed the Royal Aero Club *brevet* tests at the Grahame-White School last week.

Martinsyde monoplane, and Mr. Alcock the Maurice Farman biplane.

On Sunday, Mr. Barnwell was first out on the Vickers Blériot, flying well in a tricky wind, followed by Mr. Alcock on the Maurice Farman, Mr. Waterfall on the Martinsyde monoplane, Mr. Merriam on the Bristol biplane, and Messrs. Barnwell and Elsdon on Vickers biplanes. The winners of the two free passenger flights were Lieut. McDonald, of Darley Dene, Addlestone (who was so keen on a trip in the Martinsyde monoplane that he preferred to wait until next week), and Mr. T. Hill, of 3, Corbett Cottages, Mayford, Woking (who was taken up by Mr. Barnwell on the Vickers biplane).

Bristol School.—Monday, last week, Busteed arrived from Salisbury on the Bristol scout biplane, taking only 27 mins. for the journey. During the afternoon he gave some splendid exhibitions on this machine. Merriam also took part in the Brooklands Handicap, finishing fourth.

Merriam made a test, Tuesday, and then gave tuition to Lieut. Smithies (3) and Mr. Racine Jacques, when the wind prevented further tuition.

Wednesday, passenger tuition to Lieut. Smithies and Lieut. Britten. Busteed left for Farnborough on the Bristol scout.

Thursday, Merriam up behind Lieut. Smithies on two occasions, and this pupil then made his first solos, with excellent landings. Mr. Lucas was taken for his first trip, after which the wind was too strong for school work. Busteed returned from Farnborough on the Scout machine.

Friday and Saturday, no tuition possible owing to the bad weather.

Vickers School.—Tuesday, last week, Barnwell and Knight on biplanes with Comte FitzJames, Capt. Phillips, and Mr. Dawson. Comte FitzJames and Mr. Wilberforce solos.

Wednesday, Barnwell, Knight, Elsdon, and Webb tuition on biplanes to Messrs. Dawson and Murray and Capt. Phillips. Comte FitzJames and Mr. Dawson solos. Barnwell, Elsdon, and Mr. Hinshelwood on Blériot mono.

Knight on biplane, Thursday, with Mr. Murray. Comte FitzJames solo. Mr. Wilberforce, Comte FitzJames, and Mr. Dawson each went through their *brevet* tests in fine style.

Saturday, Barnwell and Knight on biplanes with Messrs. Murray, Underhill, and Liddell (new pupil). Lieut. Acland and Mr. Underhill solos on biplane.

Sunbeam Activity.—The 100 h.p. Sunbeam-engined Maurice Farman, piloted by J. Alcock, at Brooklands aerodrome on Monday last week was flying all day with and without passengers, also cross-country and exhibition flights.

Tuesday, there was cross-country flying and exhibition flying.

Wednesday, fine exhibition flights during the day.

Cross-country flights with Mr. J. Robins again Friday, also exhibition flights during the day.

Saturday, exhibition and cross-country flying during the day.

Two flights were made Sunday in the wind with Mr. J. C. Robins, when the magneto gave trouble, so flying was ended for the day.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Sunday, last week, Prince Sapieha solo circuits, and on Tuesday Prince Sapieha solo circuits, &c., again. Mr. Smiles straights with Instructor Cripps and alone. Mr. A. Boyesen (new pupil) rolling with Instructor Cripps.

Wednesday, Prince Sapieha solo circuits, &c., afterwards going in for *brevet* tests and gaining his certificate. Major Piercy and Mr. Smiles straights with Mr. Cripps. Mr. Parker solo circuits and figures of eight. Mr. A. Boyesen rolling alone.

Thursday, Messrs. Moore, Boyesen, Cowley, and Robinson straights with Instructor Birchenough. Mr. Smiles and Major Piercy solo straights. Mr. Parker circuits.

Beatty School.—During last week work done by pupils on dual control Wright biplane with Instructor M. Baumann was: Mr. Ding 13 mins., Monday; Tuesday, Messrs. Ding, 22 mins.; F. Ruffy (new pupil), 15 mins.; Messrs. Stewart and Watts each 15 mins. Wednesday, Messrs. Ding, 31 mins.; Bentley, 15 mins.; Ruffy, 15 mins.; Stewart and Watts, 15 mins. each. Thursday, Messrs. Ding, 10 mins.; Ruffy, 18 mins.; Bentley, 9 mins.; Stewart, 10 mins.; Watts, 12 mins. During the Wednesday morning training Mr. Ding was doing figures of eight in good style, and made some good landings. Mr. Bentley making good progress.

W. H. Ewen School.—On Monday, last week, school was out at 6 a.m. On 35 h.p. Caudron No. 1 Mr. Warren test flight, after which Messrs. G. Carruthers and F. Curtis did straights.

At 6 a.m. Tuesday Mr. F. W. Goodden test flight on *brevet* machine, followed by Mr. Curtis doing circuits. On 35 h.p. Caudron No. 1 Mr. Warren test flight, after which Mr. Carruthers did half circuits and circuits.

School out at 5 a.m. Wednesday. Mr. Curtis circuits and figure eights at 400 ft. on *brevet* machine. On 35 h.p. Caudron No. 1, Mr. Warren test flight, Mr. G. Carruthers circuits, Mr. Verney and M. Vittoz-Gallet rolling.

On Thursday school out at 6 a.m. Mr. Curtis on *brevet* machine doing circuits and figure eights to 500 ft., landing with *vol plané*.

Hall School.—Owing to the school being closed for Easter vacation there was very little practice last week. However, Messrs. Roy Gibson and Haines put in an appearance and executed several straights on Blériot Penguin. Haines, trying conclusions with No. 1 pylon, forgot to switch off, and successfully damaged both machine and pylon. J. L. Hall was flying the Avro repeatedly during the last few days of week, taking several passengers.

Salisbury Plain.

Bristol School.—Monday, last week, school closed for Easter.

Tuesday, solos were made during the day by Capt. Walcot, Lieut. Myburgh (2), Lieut. Rabagliati (2), and Lieut. Bolitho; passenger tuition was given to Capt. Walcot, Mr. Hay and Mr. Parker. School work was curtailed owing to the strong wind.

After tests had been made Wednesday by Jullerot and Voigt, Lieut. Bolitho and Lieut. Harman both flew for their certificates, which they succeeded in obtaining. Tuition was given to Mr. Parker (2), Mr. Hay (2), Lieut. Rabagliati, solos being made by Lieut. Rabagliati (3), Lieut. Myburgh (3), and Mr. Hay. No tuition was possible on Thursday, Friday and Saturday, owing to the weather being too bad.

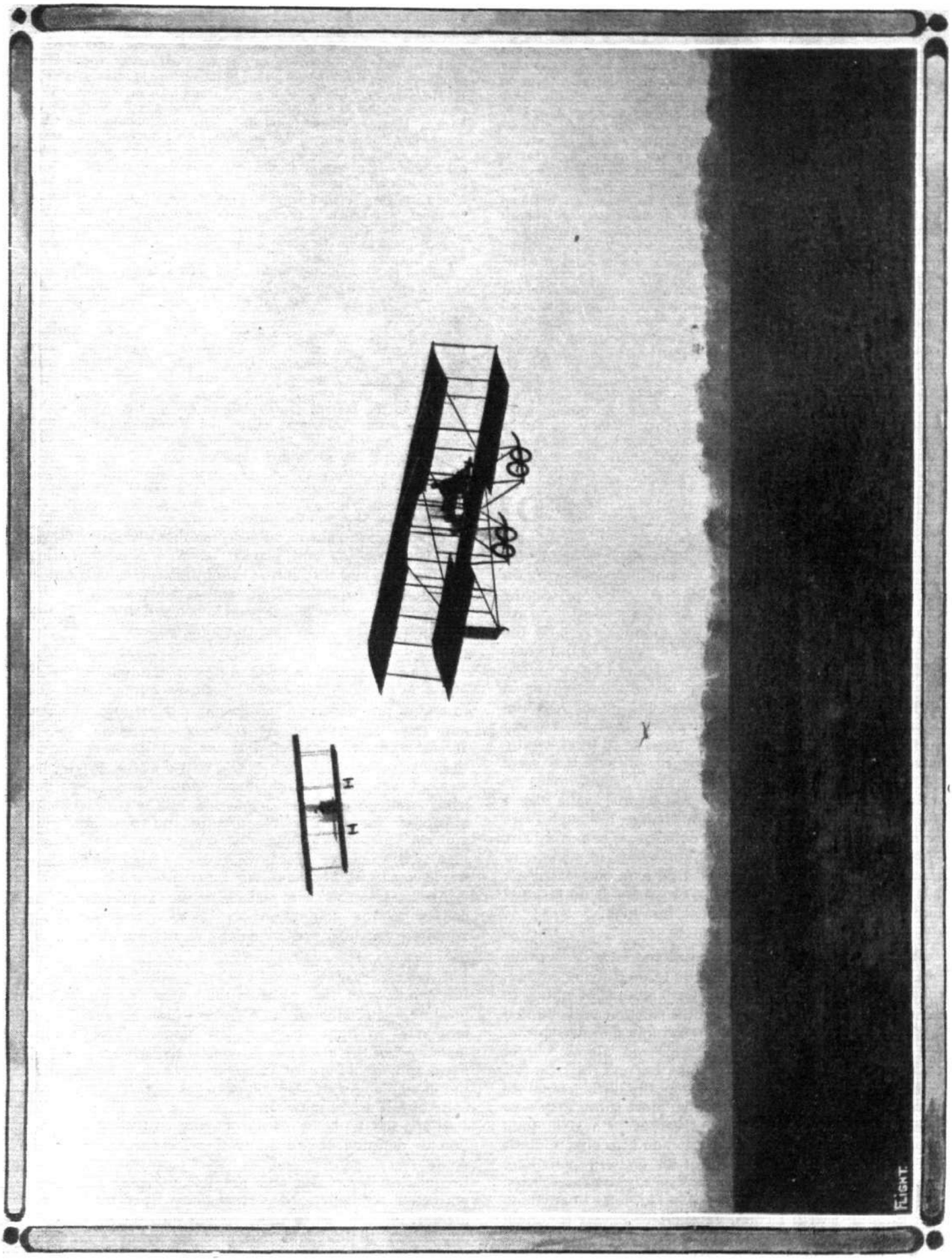
Shoreham Aerodrome.

Pashley School.—A strong wind stopped pupils doing much work during past week. Up with instructor: Wright, Dawson, Gray, Mortimer. Straights: Wright, Gray and Mortimer. Circuits: Excellent circuits by Mr Hale at 1,000 ft. Instructor for week: C. L. Pashley. Mr. Pashley took a passenger to Brighton to see the hydroplane. He left at 2,000 ft. and landed on the Hove lawns. A great crowd collected, and with their help some railings were removed and the return journey accomplished.

⊛ ⊛ ⊛ ⊛

FLYING AT HENDON.

THURSDAY of last week was the occasion of the first weekly meetings. A very good attendance resulted, including over 100 persons connected with the *Daily Sketch* scholarship scheme, who arrived in three large motor observation cars. Proceedings opened at about 3.30 p.m. with a demonstration of looping by R. H. Carr on the Grahame-White tractor biplane "Lizzie," and exhibitions by W. Birchenough on the 50 h.p. G.-W. 'bus, and J. L. Hall on his 50 h.p. Avro. Later, F. W. Goodden put up some looping on the 60 h.p. Caudron, whilst Carr, Louis Noel, and L. A. Strange each took up a passenger on the G.-W. tractor, the 80 h.p. Morane-Saulnier, and the bi-rudder 'bus respectively. Birchenough also took up a passenger on the latter machine, and R. J. Lillywhite made a flight on 'bus 109. More passengers were then taken up by Marty on the Blériot, Noel, Carr, Birchenough and Goodden, and flights were made by Hall on the Avro and N. Howarth on 'bus 109. A biplane speed handicap round six laps of the aerodrome was then flown, but as there were only two biplanes available, two monoplanes pretended to be biplanes for the occasion. Birchenough on the 'bus was limit man, Carr on "Lizzie" starting second, then Strange on the 80 h.p. Blériot, and Marty on the 60 h.p. Morane-Saulnier last. Noel was at scratch, but did not start owing to adjustments having to be made to the 80 h.p. Morane-Saulnier. Birchenough got home first with Marty and Carr second and third fairly close behind—Mr. Gates proving to be quite a successful handicapper. After the race Noel started off on the 80 h.p. Morane-Saulnier with the Prince Leon Sapieha as passenger. Noel made two successful loops at about 600 ft., and then started a spiral descent, but when approaching the ground it was noticed that the machine was banking over steeper than usual. Noel was apparently unable to flatten out, and the machine made a terrific side-slip to the ground close to No. 1 pylon. The left wing struck the ground first, crumpled up, then the machine bounced on to the right wing, and then on to the tail, and finally settled down right side up a crumpled mass of *débris* about 30 yards from where it first struck the ground. On reaching the wreck it was with some considerable surprise and relief we found that both pilot and passenger were alive and apparently but slightly injured. It was indeed a remarkable escape, which seemed all the more remarkable considering the difficulty that was experienced in extricating them from the wreckage. The only injuries received were cuts about the face, and in Noel's case the legs as well. Within an hour of the smash, both were walking about, shaken but happy! Unfortunately, the the one thing in connection with this accident that both pilot and passenger did not wish to occur, happened—that is, reports that they were seriously injured appeared in some of the evening papers. Such reports as these soon spread, especially abroad, when the victim happens to be a foreigner, resulting in much unnecessary grief to relatives and friends. No doubt the person or persons responsible for the sending out of this report witnessed the smash from afar, and as it certainly did look pretty hopeless, they jumped to the conclusion that it was more serious than it really was. Quite an hour was spent by the aerodrome Press representative in clearing up this matter, and informing the various agencies that it was only a matter of slight injuries, but still we cannot help thinking that much of this trouble could have been avoided if, immediately after the smash, announcement had been made to both the spectators and the Press how matters stood. As it was, many left the aerodrome under the impression that the victims were either killed or not likely to recover. However, all's well that ends well. As soon as it was found that the Prince and Noel were all right



RACING AT HENDON.—A G.W. 'bus, and on left "Lizzie."

several more exhibition and passenger flights were made before the proceedings were brought to a close.

On the next afternoon, Friday, a special aviation meeting was held in aid of Dr. Barnardo's Homes, and a summer-like day brought up a very good attendance. The principal event down on the programme was a 12-mile cross-country handicap for the *Daily Telegraph* Cup, but as the wind was blowing at about 45 m.p.h. this event had to be abandoned. Some very fine exhibition flights were made, nevertheless. Carr opened the proceedings with a looping demonstration on "Lizzie," in spite of the fact that at times he made but little headway against the wind. Marty then gave a wonderful demonstration on the 60 h.p. Morane-Saulnier, executing numerous loops, tail slides and steep bankings, finishing up with an exceedingly fine, and under the circumstances, difficult landing. Later, both Carr and Marty repeated their demonstrations of looping and trick flying. Prince Alexander of Teck, the Patron of Dr. Barnardo's Homes, was an interested spectator of the proceedings.

The Second Spring Meeting was held on Saturday afternoon last under very pleasant weather conditions, but unfortunately the wind was still rather troublesome, so much so that the principal event down on the programme, a 9-mile speed handicap for the Lord Charles Beresford Trophy, had to be abandoned, and a 12-mile cross-country handicap held in its place. The first to ascend was R. H. Carr on "Lizzie," who made three loops at heights of about 600 ft. He was followed by W. Birchenough on the G.-W. bi-rudder 'bus, P. Marty on the 60 h.p. Morane-Saulnier, and L. A. Strange on the 80 h.p. Blériot with a passenger. F. W. Goodden then ascended on the 60 h.p. Caudron and executed three separate loops, and exceedingly clean ones too, at heights of about 500 ft. He then climbed to a height of 1,000 ft. or so and made a triple loop to about 500 ft., after which he landed, having been aloft for 20 minutes. Marty next made a flight with a passenger on the Blériot, after which a start was made for the cross-county race. Four started in this event as follows: W. Birchenough on the bi-rudder 'bus (7 mins. 43 secs.); R. H. Carr on "Lizzie" (2 mins. 25 secs.); L. A. Strange with a passenger on the 80 h.p. Blériot (1 min. 40 secs.); P. Marty on the 60 h.p. Morane-Saulnier (scratch). Carr soon obtained the lead, only to lose it to Marty at the finish by ⅕ sec., Birchenough coming in third some 35 secs. after Carr. After the race several more exhibition and passenger flights were made by Marty and Strange on the Blériot, Carr on "Lizzie," and Birchenough on the 'bus. Marty also gave another demonstration on the Morane, in which he executed three single loops, one double loop and three tail slides. Amongst the spectators were Prince Louis of Battenberg, Prince Leon Sapieha (none the worse for his mishap), Lord Portarlington, Lieut. Spencer Grey, &c.

Sunday brought another brilliant day and a large attendance of visitors, amongst whom were Lord Lascelles, Lady Alistair Innes-Kerr, Sir Mathew Wilson, M.P., the Baron and Baroness de Meyer, &c.

Fine looping displays were given by R. H. Carr on "Lizzie," F. W. Goodden on the 60 h.p. Caudron, P. Marty and Gustav Hamel on Morane-Saulniers. Hamel made nearly twenty loops during his demonstrations. Other exhibition flights were put up by J. M. Cripps and W. Birchenough on G.-W. 'buses, L. A. Strange on the Blériot, J. L. Hall on his 50 h.p. Avro, whilst Claude Grahame-White went up on the Morane-Saulnier. Louis Noel paid a visit to the aerodrome during the afternoon, feeling quite recovered from his spill of Thursday.

⊛ ⊛ ⊛ ⊛

EDDIES.

I UNDERSTAND that the Grahame-White school are adding yet another good pilot to their already strong list of flyers, in the person of Frank Goodden, late instructor to the W. H. Ewen school at Hendon. It is only during the last few weeks that Goodden has come into the eye of the public by reason of his looping feats on the Caudron biplane, but as reported in FLIGHT some weeks back when his portrait had the place of honour in our "Men of Moment" series, he is by no means young in aviation, although his retiring nature has not allowed him to appear in the limelight to any great extent. He is a first-rate pilot and the G.-W. school are to be congratulated on having secured his services. If there is a regret at the change at all, it is a very small one: he flies the Caudron with such remarkable skill that I am just a little sorry to see him change, although there is no doubt he will soon be equally at home on any horse in the stable. Perhaps I am wrong in sticking to that old theory of mine about "One man one machine," but looking back over the past two years I do not feel like changing it. Anyway, I wish him luck.

× × ×

It seems that the London Aerodrome must do nothing but think of the comfort of visitors to their flying ground, they are for ever devising some fresh method of adding to it. One would have thought that the pavilion as elaborated last year was the last word in comfort and decoration, but now it has again been improved almost out of all knowledge. Having for reasons beyond their control had to remove the grass (?) where the little tea-tables stood, and replace it by something more solid, they now stand the tables on squares of carpet in a style quite oriental. The interior of the pavilion also now reminds one of a lounge in the palace of an Eastern potentate, with its many palms and fern-baskets and its easy chairs. Being like the Lord Mayor's fool of old, fond of anything that is good, I wish I could go there every day to lunch. Will it ever become an aviation club in the true sense of the word, with a list of paying members? I rather think I shall move Hendon way if it does.

Whilst on the above subject, another pleasant innovation is the singing and playing of Miss Murray, during the time the cup that cheers is imbibed. Her installation was quite a happy thought, and it adds much to the pleasure of visitors to hear good music and singing during the intervals from watching the loop-loopers.

× × ×

Experiences, amusing and otherwise, naturally come to a man in the position of Mr. Hucks, travelling from end to end of the country in the execution of his engagements, and not the least of the amusing ones befel him at Bristol recently. Missing the car sent to meet him at the station, he took a taxi. On arrival at the ground he was not recognised by the local commissionaire, so the usual admission fee was demanded. When Mr. Hucks informed the man of his identity he was met with amused incredulity, and his scepticism was simply increased when Mr. Hucks ventured to suggest that they would not be able to have the show without him.

As a last resource a policeman was requisitioned to convey to the committee Mr. Hucks' request to be admitted, and after a short delay the way was cleared.

× × ×

Inverted flying in a wind evidently calls for more careful handling of the controls than most people would imagine, especially on a Blériot, which always has a tendency to right itself if left alone. The "automaticity" of the machine is constantly striving to assert itself, and should a gust cause it to bank even slightly, the monoplane will whip round to its normal attitude in spite of full use of the warp.

It appears to be a matter of sense of feeling in addition to delicacy of touch, as the corrections must be made very gently and at the moment when the irregularity first starts, and not left till later and then corrected suddenly. Mr. Hucks says that he has the greatest difficulty in keeping his machine on its back for any length of time, and that inverted flying is infinitely more difficult than looping.

"WILL O' THE WISP."

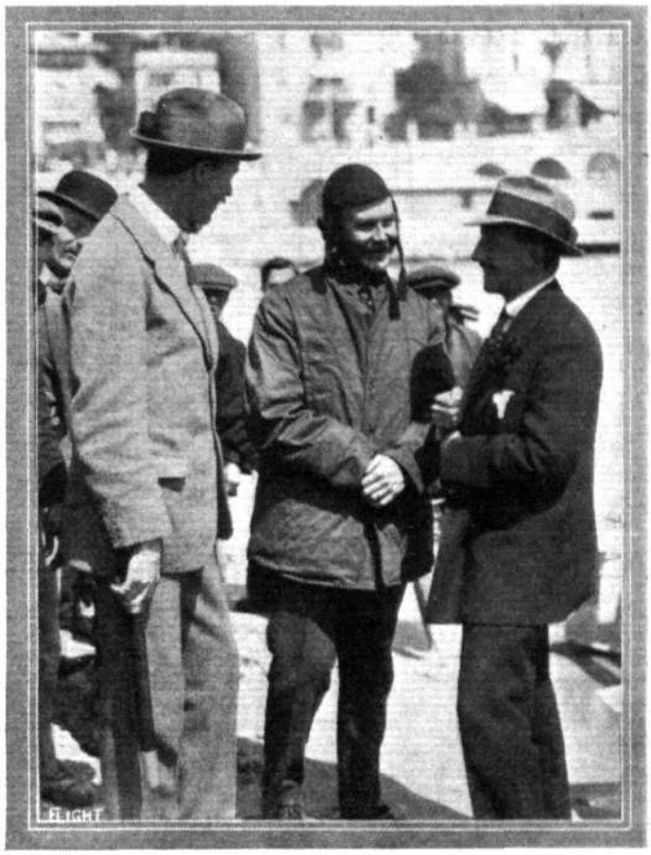
FLIGHT

THE SCHNEIDER CUP COMPETITION.

IT is almost impossible to over-rate the importance of the winning of the Schneider Cup by the Sopwith machine piloted by Mr. C. H. Pixton. At any rate the French have made no secret of the fact that they consider the British victory as a most serious blow at the prestige of French aviation. It may be recalled that this year the competitors were set the task of flying a distance of 150 nautical miles, or 280 kiloms. This flight had to be immediately preceded by one round of the course, in which the competitor was required to "taxi" across the line before rising, then make two descents to the surface of the sea at specified points. Then, without alighting, it was necessary to continue for the flight proper, the starting line having to be crossed in full flight, and as the course was ten kiloms. round, 28 laps had to be covered. Entries had been received from France, Great Britain, the U.S.A., Switzerland, and Germany. Those competitors who were present at the contest on Monday were: Espanet (Nieuport), Levasseur (Nieuport), and Garros (Morane) for France; C. H. Pixton (Sopwith) and Lord Carbery (Deperdussin) for Great Britain; Burri (F.B.A.) for Switzerland; and Weymann (Nieuport) and Thaw (Deperdussin) for the U.S.A. Stoeffler, who was Germany's representative, had a smash on the previous day, as also did Lord Carbery on his Morane, but he promptly made arrangements to use Janoir's Deperdussin in the actual race.

The rules specified that the start must be made between 8 a.m. and sunset, and when two bombs were fired at 8 a.m. on Monday the sea in the Bay of Monaco was calm, but there was a strong easterly wind. Almost immediately after the firing of the bombs Levasseur and Espanet made their appearance, and after carrying out the preliminary round in fine style started on the long flight. Pixton started at 8.16, and the magnificent way in which the Sopwith effected its *amerrissages*, together with its great speed made a very favourable impression. Pixton's time for the preliminary round was 4 mins. 27⅘ secs., while Espanet took 8 mins. 55⅘ secs., and Levasseur 9 mins. 17 secs., while Burri, who was the next starter, took 6 mins. 17⅘ secs.

Lord Carbery made one round of the course, but, finding some difficulty in handling a machine with which he was not familiar, decided not to continue. Meantime, the other four had been flying regularly, with Pixton steadily building up a long lead. The times for the first 50 kiloms. were: Pixton, 20 mins. 57 secs.; Burri, 29 mins. 17 secs.; Espanet, 28 mins. 13 secs.; Levasseur, 30 mins. 5 secs. At 100 kiloms. the position was: Pixton, 41 mins. 33 secs.; Burri, 57 mins. 54 secs.; Espanet, 51 mins. 53 secs.; Levasseur, 54 mins. 46 secs.; while at 150 kiloms. Pixton's time was 1 hr. 2 mins. 31 secs.; Burri, 1 hr. 27 mins. 36⅘ secs.; Espanet, 1 hr. 16 mins. 47 secs.; Levasseur, 1 hr. 22 mins. 56 secs. At the 16th round Espanet retired, and in the next round Levasseur followed. Pixton now began to slow a little, and his time for 200 kiloms. was 1 hr. 24 mins. 4 secs., while Burri's was 1 hr. 57 mins. 39 secs. After the 23rd round Burri returned to port to pick up some more petrol, and in the meantime, the Sopwith having easily completed the full distance, Pixton decided to make two more rounds so as to be timed over 300 kiloms., which were completed in 2 hrs. 9 mins. 10 secs. No other competitor started, but later in the day Levasseur resumed with the intention of qualifying for third place, but after completing nine more rounds he retired. The result of the race was therefore: C. Howard Pixton, Sopwith hydro-biplane, who covered the 150 nautical miles in 2 hrs. 13⅘ secs., first, with Burri on the F.B.A. flying boat, whose time was 3 hrs. 24 mins. 12 secs., second. Both these machines were fitted with Gnome engines and Integral propellers.



AFTER THE SCHNEIDER CUP RACE.—Mr. Howard Pixton, the pilot of the victorious Sopwith seaplane, being congratulated by M. Schneider. On the left is Mr. DelaCombe, one of the British representatives of the Royal Aero Club at the meeting.

The British delegates, representing the Royal Aero Club, were Messrs. G. Holt Thomas, H. DelaCombe, Lieut. C. L. Courtney, and Harold E. Perrin. The cup was formally presented on Tuesday, when Mr. T. O. M. Sopwith, Mr. Pixton and the British delegates were presented to the Prince of Monaco.

⊛ ⊛

THE MONACO AERIAL RALLY.

As briefly announced in our last issue, the best flight recorded at the close of the competition on April 15th was that of Garros over the Monaco–Buc course, while his second flight over the Brussels route secured for him the second place. Briefly the result was as follows:—

1. Garros (Morane-Saulnier, Gnome motor, Integral propeller), Monaco–Paris, 1,293 kiloms. in 12 h. 14 m. 21 s. Over land, 10 h. 32 m. 53⅘ s. Over sea, 1 h. 41 m. 27⅕ s. (record).
2. Garros (Morane-Saulnier, Gnome motor, Integral propeller), Brussels–Monaco, 1,293 kiloms. in 12 h. 27 m. 13 s. Over land, 10 h. 7 m. 18 s. (record). Over sea, 2 h. 19 m. 55 s.
3. Brindejonc des Moulinais (Morane-Saulnier, Gnome motor), Madrid–Monaco, 1,293 kiloms. in 16 h. 2 m. 21⅗ s. Over land, 12 h. 53 m. 21⅕ s. Over sea, 3 h. 9 m. 10⅗ s.
4. Renaux (M. Farman, Renault motor), Buc–Monaco, 1,293 kiloms. in 53 h. 58 m. 43⅗ s. Over land, 51 h. 5 m. 13 s. Over sea, 2 h. 53 m. 30⅗ s.
5. Verrier (H. Farman, Gnome motor), Buc–Monaco, 1,293 kiloms. in 63 h. 15 m. 28 s.
6. Garros (Morane-Saulnier, Gnome motor), Brussels–Monaco, first time, 245 h. 45 m. 46 s.

On the last day of the competition Brindejonc des Moulinais completed his flight over the Monaco–Milan course, but owing to a stop at Padua was disqualified. Garros won the prize of 25,000 francs for the best time over any course, 5,000 francs for his flight to Buc, another 5,000 francs for his flight from Brussels to Monaco, as well as the prizes of the French President, the Grand Duchess of Mecklenburg, the French Naval Minister, and the Belgian Aero Club. Renaux was awarded the prize of 10,000 francs for the best flight by a machine having more than 25 square metres of surface, while Brindejonc took the 5,000 francs for his Madrid–Monaco trip. The only other competitor to finish at Monaco was Mallard on a Nieuport, and he and Verrier were awarded 4,000 francs each, while Hirth, Brindejonc, and Moineau, who covered more than 1,000 kiloms., were given 3,000 francs each, and Stoeffler and Molla, who completed more than 500 kiloms., 1,500 francs each.

⊛ ⊛ ⊛ ⊛

St. Petersburg to Pekin.

THE Russian Aero Club has now decided upon the route which is to be followed by the aviator Janoir in his flight from St. Petersburg to Pekin. There will be fifteen stations on the way at Moscow, Samara, Oufa, Kourgau, Omsk, Tomks, Krasuoiarsk, Nijnioudinsk, Irkoutsk, Tchita, Matziewskaia, Tsitsckar, Kharbine, Mouckden, Takou, and the total distance will be about 9,000 kilom.

NAVAL AND MILITARY AEROPLANE ENGINE COMPETITION.

ENGINE TESTING ARRANGEMENTS AT THE ROYAL AIRCRAFT FACTORY.

THE engine testing plant that will be used in the forthcoming Naval and Military Aeroplane Engine Competition is well worthy of the studious attention of engine manufacturers in general and of aeronautical engine specialists in particular. Two fundamental conditions must be satisfied by any plant which is to be used for a purpose of this nature, before the results obtained from tests made with it can be accepted as giving a true indication of performances in actual practice: (*a*) the apparatus employed must be absolutely reliable in every respect, and (*b*) the arrangement must be such that the conditions under which the tests are carried out are analogous to those under which the engine will be subsequently engaged. The fulfilment of these conditions is often a difficult matter, especially where exact measurements are required to be made; but in both of these aspects the plant at the Royal Aircraft Factory will be regarded with a considerable amount of satisfaction, as in its design and construction, special precautions have been observed to ensure the accuracy of the measurements of the power developed, and the fuel, oil and water used, as well as the velocity of the air over the engine. Means have also been provided whereby, if desired, the engine may be tilted (in either a lateral, or a longitudinal direction) to any angle up to 15°; and a thrust or a pull may be applied to the engine crank-shaft.

The instruments employed for measuring fluid flow merit careful examination, not from any novel feature in their construction, but because they represent special applications of certain well-known devices in order to achieve a high standard of accuracy with the minimum of complication and of care in observation.

There are eight test beds, six of which are fixed to the ground, whilst two may be inclined in any direction—the framing for the latter being supported in trunnions and fitted with locking gear for holding the bed in any desired position. The former are in one building, but each is arranged in a separate compartment, the walls of which are carried to a sufficient height above the ground level to completely isolate one engine from another. A workshop, fitted with vice benches, a drilling machine, &c., is provided in the same building so as to allow competitors to effect such small adjustments as may be required in finally fitting and tuning up their engines on the premises. The engines are received in a room adjoining, where the weights, &c., are recorded; but the tilting beds are in a separate building.

The arrangement and details of the fixed test beds are shown in Figs. 1 and 2. These drawings are amongst those which have been

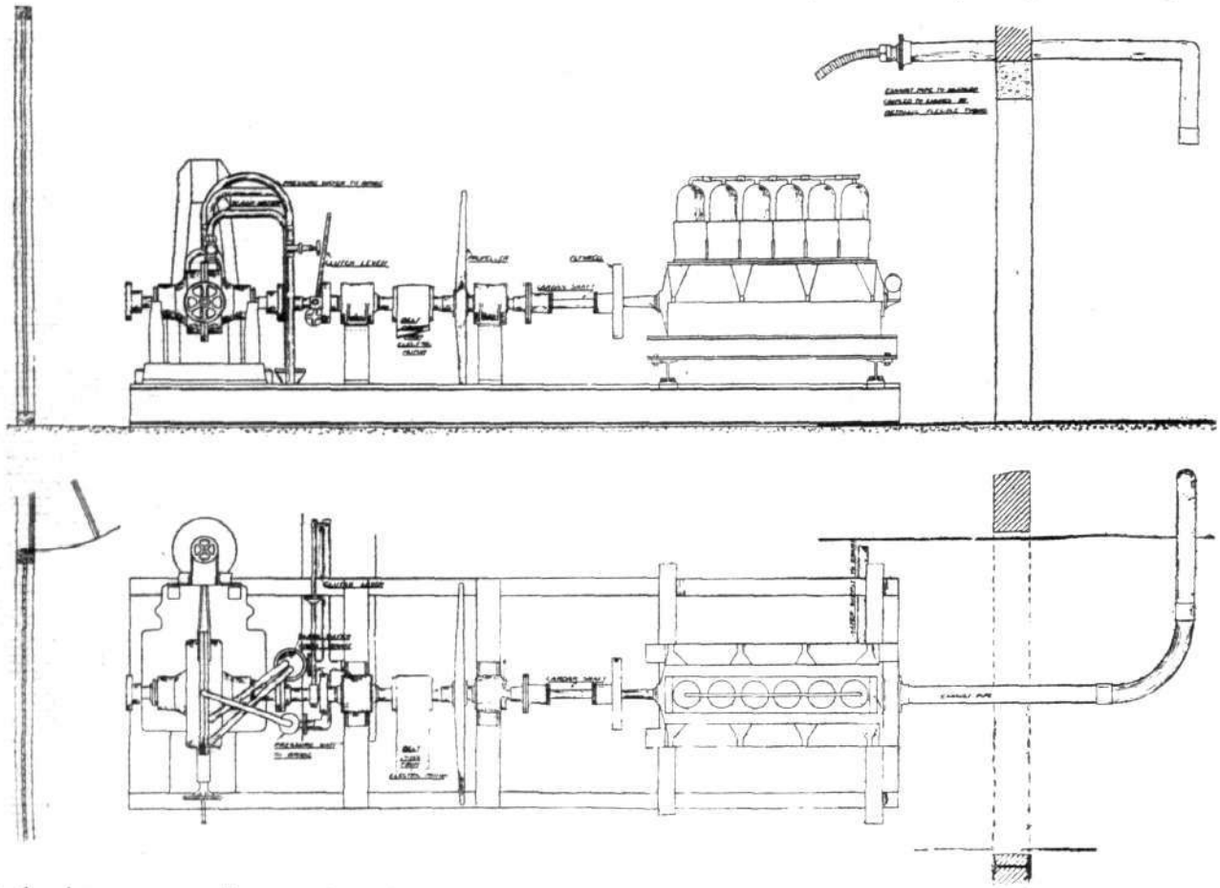


Fig. 1.—Arrangement of testing bed showing the engine, fan and brake in position, but with the air ducts removed.

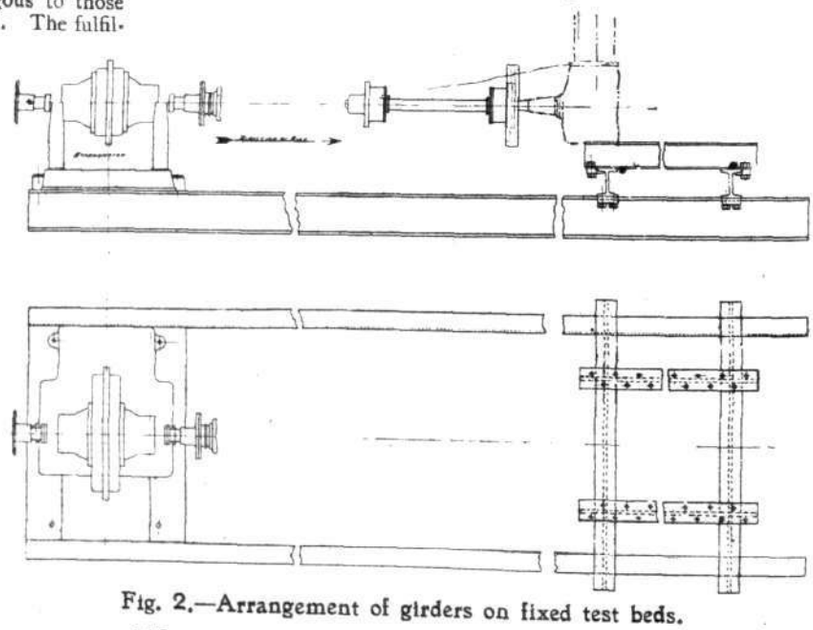


Fig. 2.—Arrangement of girders on fixed test beds.

supplied to various entrants in this competition and to others interested in the erection and the equipment of similar testing plants. Two longitudinal channel girders are grouted into the floor, and carry the water dynamometer at one end and two H section cross girders at the other. These latter are attached to the fixed girders by means of sliding clamps; and, with the short

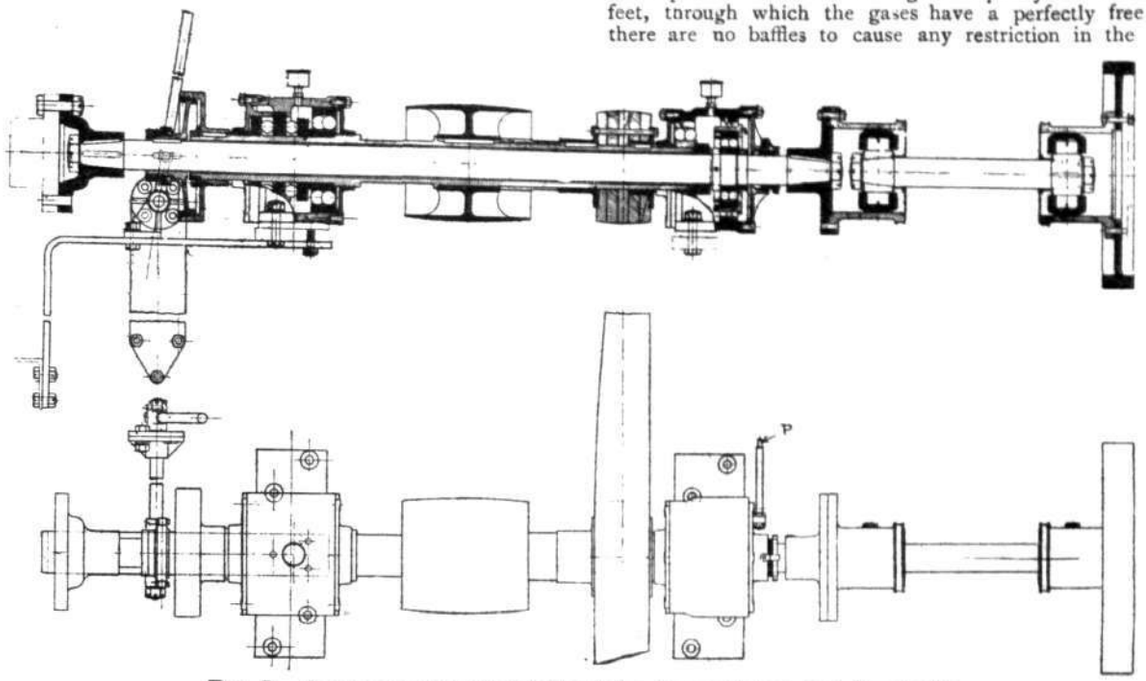


Fig. 3.—Arrangement and details of the transmission and fan shafts.

beams placed above them, may be secured in any desired position, thus rendering it possible to readily mount an engine of any size and type upon the bed. Any manufacturer, however, is at liberty to supply his own supports for attachment to the lower fixed girder, should he wish to do so. The tilting beds are similarly provided with adjustable girders to facilitate the mounting of the engines.

It will be seen from Fig. 1 that the engine is not rigidly attached to the brake, but that the power is transmitted through a short

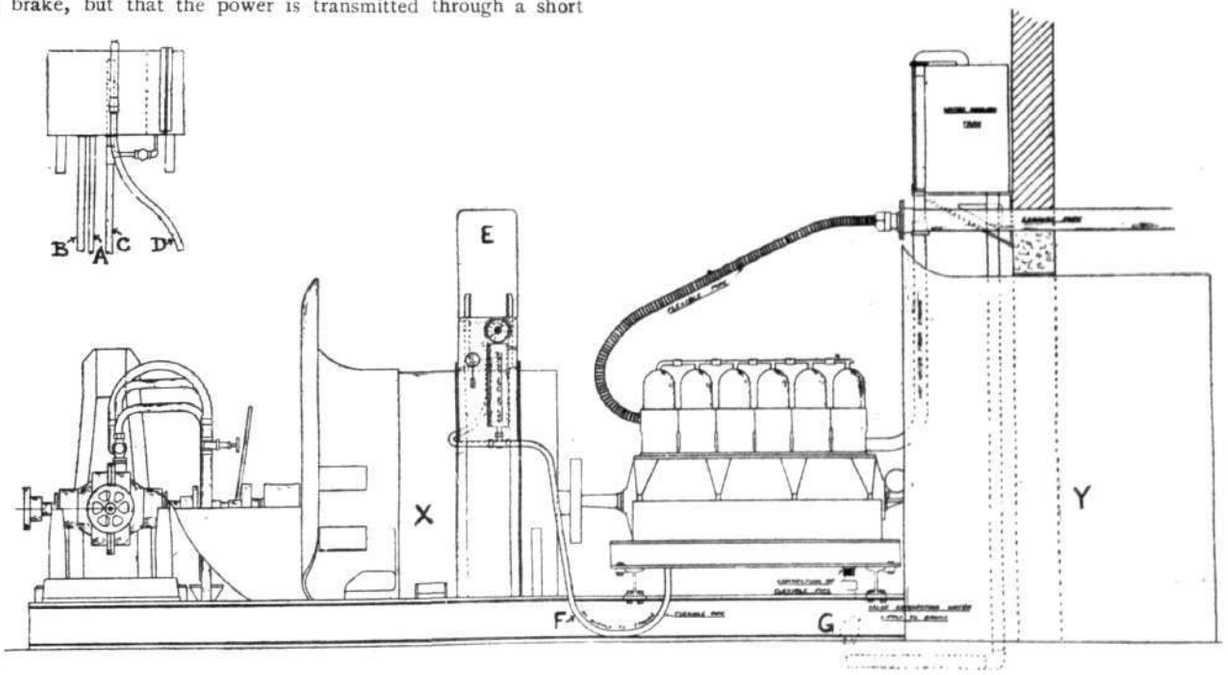
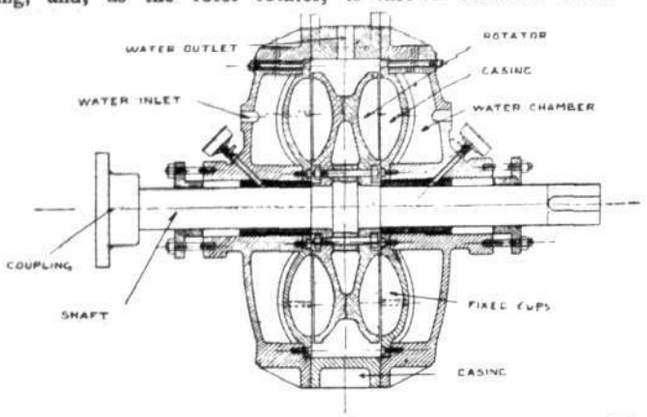


Fig. 4.—Arrangement of oil, water and exhaust piping. The air casings are also shown in position.

cardan shaft fitted with universal joints at both ends, and similar in design to those used in automobile practice, so that the slightest defect in the alignment of the engine shafting with the brake shafting will not introduce any inaccuracy in the measurement of the power, neither will there be any thrust or pull on the engine or brake shafts. The details of this shafting are clearly shown in Fig. 3. The exhaust gases from the engine are carried away by means of a flexible metallic tubing having a diameter of 4 ins., connected at one end to the engine exhaust pipe, and at the other to a pipe which passes through the wall to the outside of the building (see Fig. 4). The latter pipe terminates in an expansion chamber having a capacity of about 130 cubic feet, through which the gases have a perfectly free passage as there are no baffles to cause any restriction in the flow. Flap doors are, however, provided in order to quickly release the pressure generated in the event of an unexploded charge becoming fired within this chamber or in the piping communicating with it. A tachometer is driven from the extreme end of the brake rotor shaft by means of flexible shafting, and a revolution counter, for recording the exact number of revolutions made by the engine, is also fitted, as the tachometer merely indicates the revolutions per minute at any instant, and does not register the revolutions made during an interva of time, which is the important factor in determining power.

The dynamometers used are of the type which is manufactured by Messrs. Heenan and Froude, of Worcester, and in view of the fact that Osborne Reynolds, when carrying out his experiments in connection with the Mechanical Equivalent of Heat, employed a

machine embodying the same principle, and a similar construction, there can be no doubt as to their accuracy. The power absorption portion of this machine is in two parts—the rotor, which is a cylindrical casting driven by the engine, and the casing. On the two side faces of the rotor and in the adjacent surfaces of the casing are semi-elliptical cups placed radially as shown in Fig. 5. Water is admitted to these cups *via* the centre of the casing, and, as the rotor rotates, is thrown outwards under



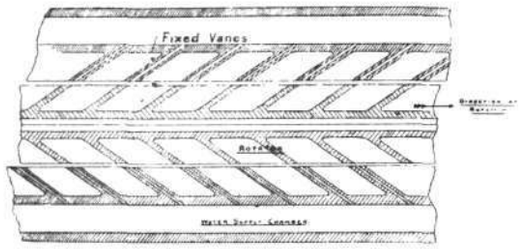


Fig. 5.—Heenan and Froude water dynamometer.

centrifugal force. The disposition of the cups in the rotor is such that the outer edge of the semi-ellipse is directed forwards in the direction of rotation, while that of those in the casing face in the opposite direction; consequently, as the water moves outwards, it is projected into the casing cups, and passing inwards towards the centre becomes thrown into the inner edges of the rotor cups, whereupon the circulation is again repeated. The churning of the water in this manner, it will be seen, raises its temperature (thus absorbing the power) and tends to rotate the casing in the direction of motion, upon the ball bearings by which it is supported. This is resisted by a heavy weight suspended from the end of an arm which is attached to the exterior of the outer casing and moves between two fixed stops carried upon the base of the apparatus. A balance, supported upon a special framing, is also attached to the arm and is so arranged that when the engine is not running the balance supports the heavy

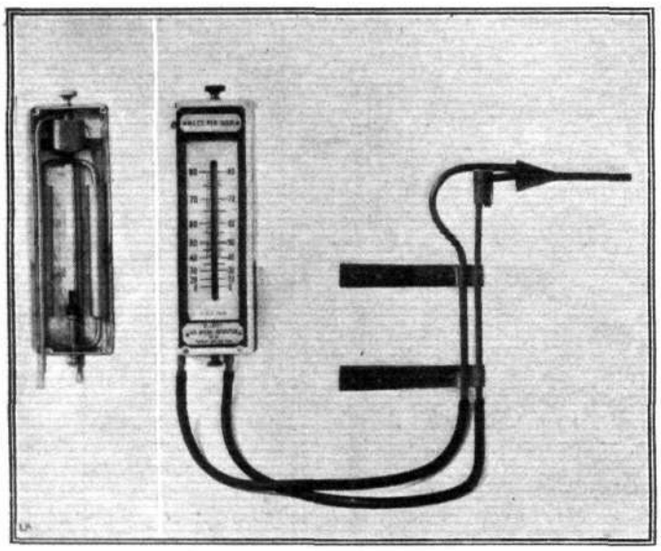


Fig. 6.—Air velocity meter for continuously indicating the draught in the air tunnel in which the engine is working. The internal construction of the velometer is shown on the extreme left.

weight. When power is being transmitted, however, the balance registers the difference between the effective force acting at a radius equal to the horizontal distance between the vertical centre line of the balance and the axis of rotation and the heavy weight. Hence, by subtracting the weight recorded on the balance from that of the heavy mass and multiplying by the horizontal radius at which the force acts, we obtain the torque of the engine direct. There is no necessity for any correction for efficiency, as any friction at the glands which are provided round the shaft at the centre of the casing for preventing leakage of water at that part, or between the sides of the rotor and the casing, is automatically added to the reading recorded on the balance.

To prevent an excessive rise of temperature of the water, a continuous supply is provided, which is controlled by vanes interposed between the rotor and the casing, by means of which also the amount of power absorbed is also regulated. These vanes are moved from without by the handwheel seen in Fig. 1, and increase or decrease the effective area of the semi-elliptical cups. The heated water is taken off at the periphery of the casing, as may be observed by reference to the diagrams. This form of brake enables great uniformity of engine speed to be readily obtainable, provided that the supply of water is kept constant, since, because the power absorbed varies as the cube of the speed of revolution, it is necessary that there should be fairly large increments of torque in order to produce small increases in the revolutions; and conversely, the power developed may fall off appreciably without causing an abnormal reduction of the engine speed. This constancy of water supply is assured by feeding the plant from a tank, which also supplies the water service in the test rooms when required, of 12,000 gallons capacity, which is placed in such a position that a head of about 35 ft. of water is maintained. Such an arrangement is far superior to a lead taken direct from the ordinary water mains, where the pressure may vary somewhat from time to time and so permit the engine to "hunt."

The cooling arrangements fall naturally under two headings—water and air. As regards the former, on one wall of the test room there is a water tank (see Fig. 4) which may be connected to the engine directly should it be desired to test a water-cooled engine without its radiators: but if the engine is to be run on its radiator alone, an air velocity of about 60 miles an hour is provided over the engine and the radiator, the draught being created by a special fan. The pipe connections to the water tank in the room are five in number. The cold water supply from the main service is delivered through the pipe A to the tank, from whence it is led by the lead B to the cooling system of the engine:- the hot water return being *via* pipe D—of flexible tubing—*which discharges to* an overhead swivelling pipe. By this means any desired temperature limits may be obtained, as by increasing the cold water supply the temperature in the water can be decreased, the surplus water overflowing to waste by the pipe C, and by controlling the valve G, the water outlet temperature may be lowered or raised. The tank is divided into two compartments—to one of which the aforementioned connections are made, whilst to the other (which is calibrated) a bye-pass is fitted that allows of the emptying of the tank through the waste pipe C. The second compartment is provided for measuring the water supply to the engine, as the discharge from the swivelling pipe D may be permitted to pass into it for a known time, and from this, knowing the inlet and outlet temperatures to the engine, the heat lost, as well as the quantity of cooling water, may be calculated.

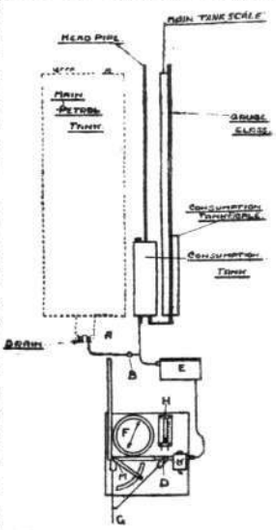


Fig. 7.—Arrangement of the petrol piping.

The air cooling arrangements are of an especially interesting character. It will be seen on reference to Fig. 3 that the transmission shaft is enclosed for a portion of its length by a tubular casing, which runs upon two ball bearings, and upon which a four-bladed fan propeller and a pulley, for driving the same from a 50 h.p. electric motor, are mounted. This tubular shaft is, however, entirely free from the internal power transmission or dynamometer shaft and runs in the same direction, a ball thrust being provided at the dynamometer end of the shaft to take the fan thrust, and a ball-bearing, mounted in a floating housing upon another ball-bearing, is fitted at the engine end. To measure the power that is absorbed at

this part of the transmission, a special arm and spring balance, which limit the movement of the housing, has been attached to the floating housing; but it is not likely that this under any circumstances will amount to any appreciable quantity, and will most probably be entirely negligible, having regard to the power transmitted from the engine.

The fan is enclosed by the steel air channel, X, shown in Fig. 4, the intake end of which has been flared, so as to facilitate the flow of air, and to obtain greater uniformity of air velocity over the section in which the engine is placed; consequently, the air is discharged directly over the engine, which is located close up to the outlet end of the channel. A second casing, Y, is fitted to the rear of the engine, which it is possible to move inwards or outwards on rails so as to bring it further over or more remote from the engine, as may be desired. This casing is provided at its outer end with doors. The division of the air casing into two parts in this manner has for its object the better examination and inspection of the engine whilst under test, and renders it possible to make any adjustments during the time that the engine is running under conditions similar to those which obtain in practice, as it has been found that practically no discomfort is experienced when standing in such a position as would be taken up by an attendant.

The air velocity is measured by means of an R.A.F. Velometer, manufactured by Elliott Bros., and is similar to those which are used on aeroplanes for determining the air speed of machines. This is composed of a U-tube of special construction—as may be observed by an inspection of Fig. 6—the two side tubes being connected to a pipe directed against the air current, and which therefore registers the static pressure plus the pressure due to the air velocity, whilst the central tube is arranged as shown, and records the static pressure alone. The resultant reading is, therefore, the pressure due to the air velocity, and the instrument has been calibrated to give the speed of the air in miles per hour from 0 up to 80, so that a continuous record of the velocity of the air over the engine is obtained. The speed of revolution of the fan can be adjusted so as to give any desired air speed over the cylinders up to the maximum required, and the specified velocity of from 55 to 60 miles per hour will be measured at a point about 6 ins. in advance of the nearest cylinder of the engine.

A piece of apparatus has been specially devised at the Royal Aircraft Factory for the purpose of determining the quantity of lubricating oil used by the engine. The oil tank, E, is mounted upon the casing, X, shown in Fig. 4, and the oil may be taken either through the flowmeter, or direct to the engine through the flexible pipe, F, by means of a three-way cock. The oil flows from the main tank to an auxiliary tank provided with a float level indicating device in which a float controls the movement of a pointer over a graduated dial by means of a cord, which is attached to the float and passes round a pulley mounted upon the pivot of the pointer. The dial of the apparatus is graduated so as to read in pints and tenths of a pint of oil; and it will be clear that when oil is being fed to the engine at a uniform rate, the pointer will rotate at a uniform speed, so that if an observer notes the time taken for a certain quantity of oil to flow to the engine, the consumption can be readily calculated therefrom. It should be noted that the apparatus is so constructed that when the auxiliary tank is filled with oil, all communication with the main tank ceases and the engine is run on the auxiliary tank alone. The arrangement employed can be seen on reference to Fig. 4, the small stop watch for timing the flow of oil being seen in the diagram.

Fig. 7 shows the arrangement of the petrol system. The main petrol tank, which has a capacity of over 100 gallons, is placed on the outside of the building. The lead to the engine is taken from A, which is a shut off cock, to the cock B, inside the test room, where it branches off in two directions—to the fuel consumption tank and to the float feed chamber E. From E, which is utilised in order to obtain a constant head of fuel, the petrol passes through a filter K and a constricted tube by a flexible pipe to the engine at G—the flow being controlled, if desired, by a cock fitted with a fine adjustment, the handle of which moves over a graduated scale, as shown at M. If it is not necessary to measure the flow of fuel, a cock is provided at D whereby the petrol may be bye-passed directly to the lead to the engine. The constricted tube mentioned above consists of two special conical tubes placed with their smaller ends together. The increased velocity of the fuel in passing through a passage having a diminished sectional area, results in a reduction of the static pressure at that section—consequently, at varying sections there are varying differences of pressure. To record the differences of pressure existing at the smallest and the largest section of the tube, a pressure gauge, F, of special design, in which a metal diaphragm is embodied, is employed—the movements of the diaphragm being communicated by a light gearing, similar to that used in aneroid barometers, to a pointer, which moves over a graduated dial. The instrument marked H in the illustration is the Velometer, which is placed in this position simply for convenience in observation.

Having described the principal features of this equipment, we would refer to the means provided for starting up the engines under test. On reference to Fig. 3 it will be seen that on the extreme left of the figure, a clutch mechanism is shown, in which the female portion of the clutch is keyed to the external fan shaft, and the inner, male portion, to the dynamometer shaft. When it is required to start an engine, the electric motor is switched on, and the clutch let in gradually by hand; but so soon as the engine commences to run under its own power, the transmission shaft is declutched, and the clutch locked in the "out" position, for which purpose suitable provision has been made.

As regards the tilting test beds, these are equipped in a somewhat similar fashion, and it should be noted that the inclination of the engine does not in any way interfere with the air cooling arrangements, because the air channel and fan are mounted, with the engine and dynamometer, upon the tilting bed.

THE ENGINES.

THERE is but little doubt that much interest will be centred, during the next few weeks, in the Engine Competition which is to be held at the Royal Aircraft Factory commencing on Saturday next. This interest will not be confined to those who have a stake in the competition, but will be shared by all concerned with aeronautics all over the world; and we anticipate that the results of the tests will provide a fund of information that should prove of inestimable service to all designers of petrol motors.

The Judges Committee is constituted by the following officers:—

Brigadier-General D. Henderson, C.B.; Captain M. F. Sueter, C.B., R.N.; Major J. D. B. Fulton, C.B., R.A.; Engineer Lieutenant E. F. Briggs, R.N.; Dr. T. E. Stanton, M.I.C.E., National Physical Laboratory; *Secretary*, Captain J. T. Dreyer, R.A.; and Lieutenant A. J. Miley, R.N.

While Engineer Lieutenant W. Briggs, R.N.; Lieutenant R. O. Abercromby, R.F.C.; Captain Bignall-Wild; Engineer Lieutenant Cave-Brown-Cave, R.N.; Lieutenant C. L. Courtney, R.N.; Lieutenant T. C. Hetherington, R.F.C.; M. O'Gorman, Esq., C.B.; and Lieutenant J. L. Travers, R.N.R., form the Committee of Management.

The conditions governing the competition, which also indicated what were considered to be desirable attributes in an aeroplane engine, were published in FLIGHT for June 14th last; but it will be well to state that the principal requirements were as follows:—the power should range between 90 and 200, the number of cylinders should be not less than four and the gross weight per horse power calculated for a six hours' run should not exceed 11 lbs., while all engines must be of British manufacture throughout. It is a matter for congratulation that almost every firm at present engaged in the construction of aeronautical engines in this country whose productions have seen service on aircraft, will be represented, and that several others who are newcomers to this branch of engine manufacture will also take part. It is also interesting to observe that 8 out of a total of 22 engines have been entered by manufacturers engaged in automobile work. There are, however, several other firms in this country who are engaged upon the development of the aeronautical engine, and it is to be regretted that from various causes they have not been able to compete on this occasion.

The accompanying table gives particulars of the engines that will participate in the competition, from which it will be seen that the various types of engines, when classified according to the arrangement of the cylinders, are fairly equally represented, the respective numbers being 5 rotary, 6 radial, 5 vertical, and 6 vee. The number of different makes of vee and radial engines manufactured is, however, likely to increase in the future, as the tendency at the present time is to increase the engine power, and in order to do this there are three alternatives—(*a*) to increase the bore and stroke, (*b*) to raise the speed of revolution and gear down the propeller, or (*c*) to increase the number of cylinders. The first method might be resorted to in some cases where, on account of the large number of cylinders, the bore and stroke is not large, but it is doubtful if it could be adopted with success with most vertical engines, as engine starting by hand becomes more difficult, and the vibration set up becomes excessive owing to the heavier explosion and inertia forces brought into play. The procedure indicated at (*b*) is already followed in existing engines with great success, but where this is the case, the engines are already of the vee type, probably owing to the better balance obtained when the two sets of cylinders have 90° between them and the more uniform torque with eight cylinders, but the object in view has largely been, to obtain a higher power/weight ratio. The problem involved, however, is not a simple one and is much more

than is indicated by mere increase in speed. Lastly, the third alternative mentioned has the great advantage that the torque variation is reduced, and in carrying it into effect, either the vee or the radial type may be chosen, both of which bring with them a lower weight per h.p. and occupy the minimum of space, while for either the two or the four stroke cycle they utilise the material to a greater extent—the advantage in this respect being with the radial type of engine. To increase the number of cylinders and retain the vertical arrangement would appear to have such disadvantages, notably in regard to the length of space occupied, and the possibility of the presence of torsional oscillation in the crankshaft, as to prohibit this method from being adopted in order to increase the power. Hence we see that the powerful engine of the future—say, all engines above 150 h.p.—will in all probability have the cylinders arranged exclusively in either the vee or the radial fashion. As regards the water-cooled and the fixed types of engine, it is not surprising to find that most engines entered are of these types, 14 being water-cooled and 8 air-cooled, while 17 have fixed and 5 have rotating cylinders. Steel is the most extensively employed material for the cylinders, as only in three makes of engine—the Anzani, the Beardmore Austro-Daimler and the Sunbeam—is cast-iron employed. This, to some extent, is the reason why overhead valves have been so largely fitted, although this arrangement also reduces the weight of the engine, and gives a better shape of combustion chamber. Some form of pump lubrication is universally employed, and on practically all engines means are provided for facilitating the starting of the engine, such as is afforded by an electrical easy-starting device or a compressed-air self-starter, while many of the engines have two-point ignition.

NAVAL AND MILITARY AEROPLANE ENGINE COMPETITION.—PARTICULARS OF ENGINES.

No.	Maker.	B.H.P.	Revs. per min.	Cylinders. No.	Bore. mm.	Stroke. mm.	Arrangement.	Material.	Jacket.	Stroke/Bore ratio.	Piston displacement per min. per B.H.P. litres	Piston speed. ft. per min.	Weight. Complete with all accessories ex radiator. lbs.	Weight. Per B.H.P. lbs.	Fuel consumption (approx.). pints.	Lubrication.	Ignition.	Carburettor.	Main bearings.	Valves. Position. Inlet.	Valves. Position. Exhaust.	Valves. How operated. Inlet.	Valves. How operated. Exhaust.
	Air-cooled.																						
1	Anzani	125	1250	10	115	155	Rad.	C.I.	—	1·35	342	1270	464	3·77	0·7	P.	Bosch	Zenith	Ball	Head	Head	A	R. & P.R.
2	British rotary	100	1100	10	124	140	Rot.	St.	—	1·13	373	1010	—	—	—	—	—	—	—	—	—	—	—
3	Gnome (2)	105	1200	9	110	150	Rot.	St.	—	1·36	293	1180	275	2·62	0·73	P.	Bosch	Special	Ball	Walls	Head	Piston	R. & P.R.
4	Hart	150	1600	9	5″	6″	Rot.	St.	—	1·20	370	1600	—	—	—	P.	—	—	Ball	Head	Head	Auto	R. & P.R.
5	Hardy and Padmore	100	—	5	4″	4″	Rad.	—	—	1·0	—	—	—	—	—	—	—	—	—	—	—	—	—
6	Isaacson	100	1200	9	120	150	Rot.	St.	—	1·25	366	1180	250	2·50	—	P.	Bosch	Zenith	Ball	Piston	Head	Mech.	R. & P.R.
7	,,	200	1200	18	120	150	Rot.	St.	—	1·25	366	1180	465	2·32	—	P.	Bosch	Zenith	Ball	Piston	Head	Mech.	R. & P.R.
8	Wolseley (semi)	90	1800‡	8	4″	5½″	Vee	St.	—	1·37	361	1650	385	4·28	0·7	D.P.	Bosch	Claudel	W.M.	Head	Head	R. & P.R.	R. & P.R.
	Water-cooled.																			Sleeve valve			
9	Argylls (2)	130	1300	6	125	175	Vert.	St.	St.W.	1·40	258	1490	600†	4·61	0·55	F.&T.	Bosch	Zenith	W.M.	Head	Head	R. & P.R.	R. & P.R.
10	Beardmore	90	1300	6	120	140	Vert.	C.I.	C.E.	1·17	273	1280	375	4·17	0·6	F.&T.	Bosch	A.D.	W.M.	Head	Head	R. & P.R.	R. & P.R.
11	Aus.-Daim.	120	1200	6	130	175	Vert.	C.I.	C.E.	1·35	279	1370	500	4·17	0·6	F.&T.	Bosch	A.D.	W.M.	Head	Head	R. & P.R.	R. & P.R.
12	Centrum*	150	900	6	150	140	Rad.	—	—	0·94	178	830	—	—	—	—	—	—	—	—	—	—	—
13	Dudbridge Ironworks	95	1250	7	120	140	Rad.	St.	C.B.	1·17	292	1150	375	3·95	0·6	P.	Bosch	Zenith	Ball	Head	Head	R. & P.R.	R. & P.R.
14	,,	130	1250	9	120	140	Rad.	St.	C.B.	1·17	274	1150	465	3·57	0·6	P.	Bosch	Zenith	Ball	Head	Head	R. & P.R.	R. & P.R.
15	,,	200	1250	14	120	140	Rad.	St.	C.B.	1·17	277	1150	660	3·300	0·6	P.	Bosch	Zenith	Ball	Head	Head	R. & P.R.	R. & P.R.
16	E.N.V.	100	1620§	8	95	165	Vee	St.	C.E.	1·74	304	1750	450†	4·500	0·6	P.	Bosch	Smith or Zenith	Ball	Head	Head	Direct	Direct
17	Green	120	1250	6	140	152	Vert.	St.	C.R.	1·08	294	1250	440	3·67	0·56	F.F.	Bosch	Zenith	W.M.	Head	Head	O.R.	O.R.
18	Sunbeam (2)	135	2000‡	8	90	150	Vee	C.I.	C.E.	1·66	227	1970	480	3·560	0·6	P.	Bosch	Claudel	W.M.	Side	Side	R.	R.
19	White&Poppe	130	1200	8	120	160	Vee	—	—	1·33	268	—	—	—	—	—	—	—	—	—	—	—	—
20	Wolseley	90	1800‡	8	3⅝″	5½″	Vee	St.	C.S.	1·46	318	1650	405	4·500	0·65	D.P.	Bosch	Claudel	W.M.	Head	Head	R. & P.R.	R. & P.R.
21	,,	130	1200	8	3⅝″	5″	Vee	St.	C.S.	1·40	332	1400	720	5·540	0·63	D.P.	Bosch	Wolseley	W.M.	Head	Head	R. & P.R.	R. & P.R.
22	Wessex	130	2200	6	105	150	Vert.	—	—	1·43	264	2160	—	—	—	—	—	—	—	—	—	—	—

* Two-stroke. † With radiator. ‡ Propeller driven at ½ engine speed. § Propeller driven at 900 revs.
Rad. = Radial. Rot. = Rotary. Vert. = Vertical. St.W. = Steel welded. C.B. = Copper brazed joints.
C.E. = Copper electrolytically deposited. C.S. = Copper screwed joint. C.R. = Copper with rubber joints.
F. & T. = Forced to shaft bearings and trough elsewhere. P. = Pump. D.P. = Double pump. F.F. = Fully forced.
W.M. = White metal. R. & P.R. = Rockers and push rods. R. = Rockers. O.R. = Overhead camshaft and rockers.

The engines enumerated in our table differ slightly from the list of engines notified officially as actually delivered at the R.A.F. For example, a 200 h.p. Isaacson water-cooled and a 90 and a 120 h.p. air-cooled engine are stated to have been delivered, whereas the Isaacson Radial Engine Co. have informed us that they only intended submitting for test 95–100 and 190–200 rotary air-cooled engines as specified in the above table.

The horsepower quoted for the various engines are those which can be developed for prolonged periods and all can carry an overload, sometimes amounting to as much as 15 per cent. for shorter periods.

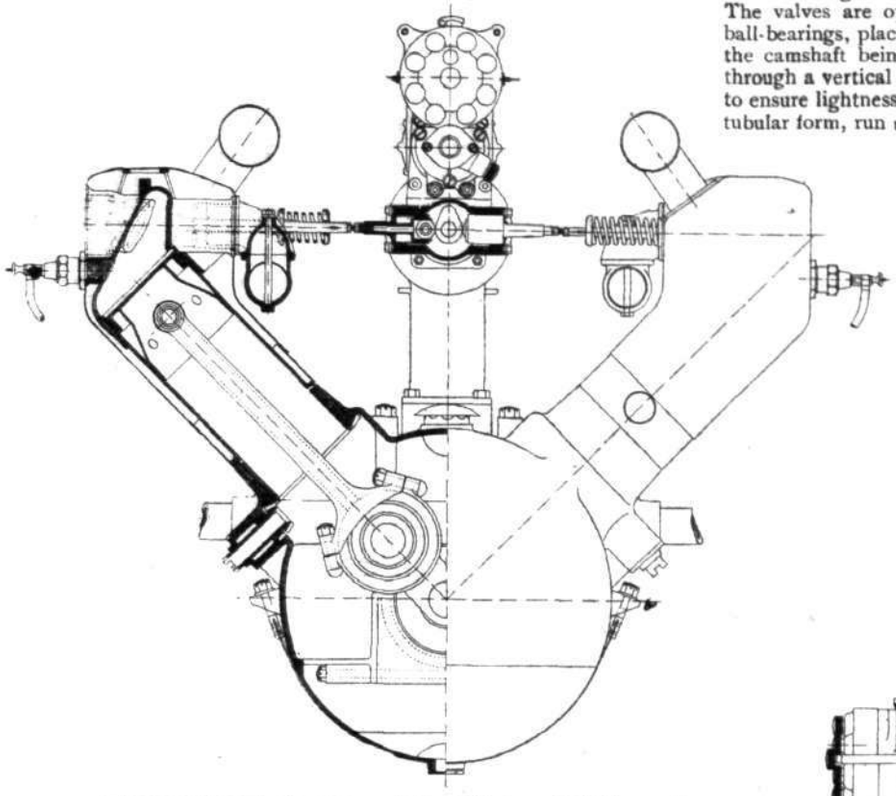
The majority of these engines have been fully described and illustrated quite recently in FLIGHT, and hence they are sufficiently familiar to our readers as to render it unnecessary to do more than refer to the dates upon which full particulars respecting them have appeared, viz. :—

Maker.	Dates.
Anzani	5th July, 1913, 24th Jan., 1914
Argyll	14th and 21st Mar., 1914
Beardmore Austro-Daimler	24th Jan., 14th and 21st Mar., 1914
Dudbridge Ironworks ...	21st Feb., 28th Mar., 1914
Gnome	14th Feb., 14th and 28th Mar., 1914
Green	14th and 21st Mar., 1914
Isaacson	21st and 28th Mar., 1914
Sunbeam	14th and 28th Mar., 1914
Wolseley	14th and 28th Mar., 1914

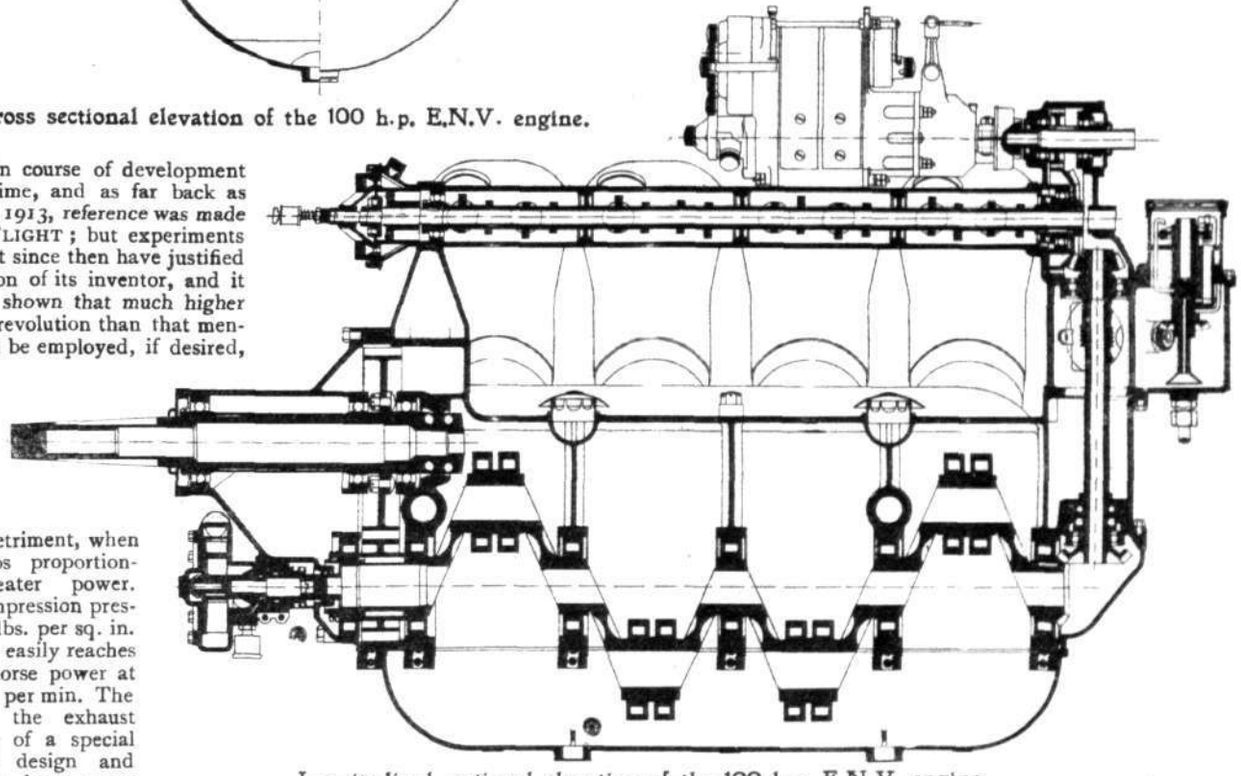
As regards the other engines :

The engine entered by the **Hart Engine Co.**, of Leeds, is a

British design of the double-motion rotary type, in which the cylinders and crank-shaft rotate in opposite directions and at the same speed of revolution—hence, although the relative speed of the cylinders to the crank-shaft is 1,600 revs. per min. as stated in the Table, the actual speed is only 800 revs. per min. This motor has been in course of development for some time, and as far back as February, 1913, reference was made to it in FLIGHT; but experiments carried out since then have justified the opinion of its inventor, and it has been shown that much higher speeds of revolution than that mentioned can be employed, if desired, without detriment, when it develops proportionately greater power. With a compression pressure of 75 lbs. per sq. in. the engine easily reaches its rated horse power at 1,600 revs. per min. The inlet and the exhaust valves are of a special concentric design and afford very large areas for the passage of the gases. We hope to deal with this engine fully in the near future.



Cross sectional elevation of the 100 h.p. E.N.V. engine.



Longitudinal sectional elevation of the 100 h.p. E.N.V. engine.

The **E.N.V. Motor** is by no means new to the aeronautical world, for as far back as 1908–09 Mr. Moore-Brabazon had one fitted upon his machine, but the E.N.V. Motor Co., of Willesden, N.W., has now formed to design and manufacture an entirely new engine which embodies many features of special interest.

The cylinders are still arranged "en V" and provided with electrolytically-deposited copper jackets, but the cylinder construction is much changed, as may be seen on an examination of the accompanying illustrations. The cylinders are held in place on an aluminium crank-case by a screwed collar that forms a part of a bevel wheel with which a small pinion engages. This pinion is mounted on a bush supported in the wall of the crankcase, which can be rotated by means of a key from the outside, so that the cylinders may be readily assembled on or dismantled from the engine with the minimum of disturbance of other parts. The valves are operated directly from a camshaft which runs on ball-bearings, placed midway between the heads of the cylinders; the camshaft being driven from the crankshaft by bevel gearing through a vertical driving shaft. Cast-iron pistons of special design to ensure lightness are fitted and the connecting-rods, which are of tubular form, run upon roller bearings on a nickel chrome crankshaft—the bearings being held in position by a strap that encircles about two-thirds of the circumference of the shaft. Particular attention is drawn to the method of supporting the crankshaft, which weighs 14 lbs., in the main bearings, which are of the ball type. This construction is adopted for the purpose of obtaining great rigidity, and it will be seen that the bearing caps are held between the "horns" by transverse bolts, while double U-bolts, which pass through columns formed integral with the crank-case to the upper surface, secure the bearing caps in position against the ball-race. The special inclined crankwebs should also be noted, as these greatly facilitate the assembling of the ball and roller bearings upon the shaft.

The propeller, as in many engines nowadays, is not directly coupled to the crankshaft, but a special shaft, of ample length to resist lateral flexure and distortion, is provided suitably mounted on ball bearings, and fitted with double-thrust bearings that can take either a thrust or a pull, the ratio of the gear-reduction being 1·8 to 1. Thus, with an engine speed of 1,620 revs. per min., the propeller rotates at 900 revs. per min. The bottom half of the crank-chamber is an aluminium casting, and is attached to the upper half by straps that are secured by eye-bolts and nuts to lugs formed thereon; whilst the engine is supported on two steel tubes that pass right through bosses cast integral with the crank-case. The water-circulating pump is of the centrifugal type, and is driven directly from the same end of the crankshaft as that at which the radiator, which is a fixed unit with the engine, is mounted.

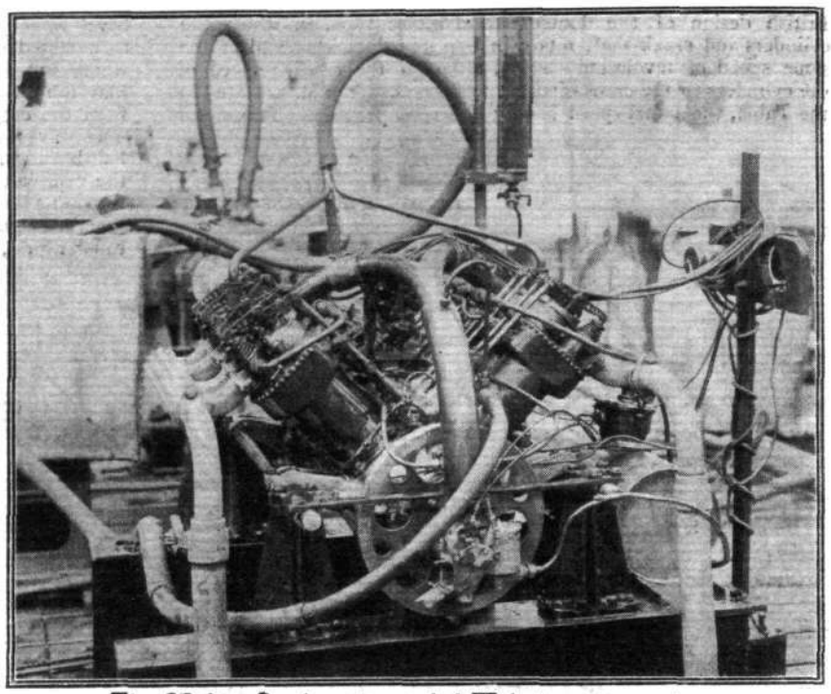
The multiple plunger oil-pump is seen in the box to the extreme right of the longitudinal sectional elevation, and is driven by worm and bevel gearing from the vertical driving shaft. A Bosch H.L.

8 high-tension magneto is fitted as well as the fitting for a compressed air self-starter, for which the distributing valve is to be seen on the extreme end of the camshaft.

The engine forms an extremely compact, complete and accessible power unit, and leaves little to be desired from the points of view of rigidity and workmanship, and should give a good account of itself in the competition.

The **Wolseley 90 h.p. engine** is similar in general design to the 75 h.p. air-cooled engine which was dealt with in FLIGHT for March 28th last, excepting tha water-cooling has been substituted for the air-cooling. Hence it will be unnecessary to give any further particulars on this occasion.

The **10-cylinder 125 h.p. Anzani**, it should be noted, is the first of the British-built models, and has been manufactured by the Coventry Ordnance Works, Ltd. On the occasion of a visit recently to these works, M. Anzani expressed himself as well satisfied with its up-to-date equipment and with the excellence of the workmanship displayed in the Military Trials engine. It is identical in its general design with those engines built in France, and in its preliminary tests has performed very satisfactorily. So much so, in fact, that we understand that in a non-stop run of 11 hours the engine ran at a greater number of revolutions and developed more power than any of the French engines of similar size.



The 90 h.p. 8-cyl. water-cooled Wolseley aero engine.

⊛ ⊛ ⊛ ⊛

THE ROYAL FLYING CORPS.

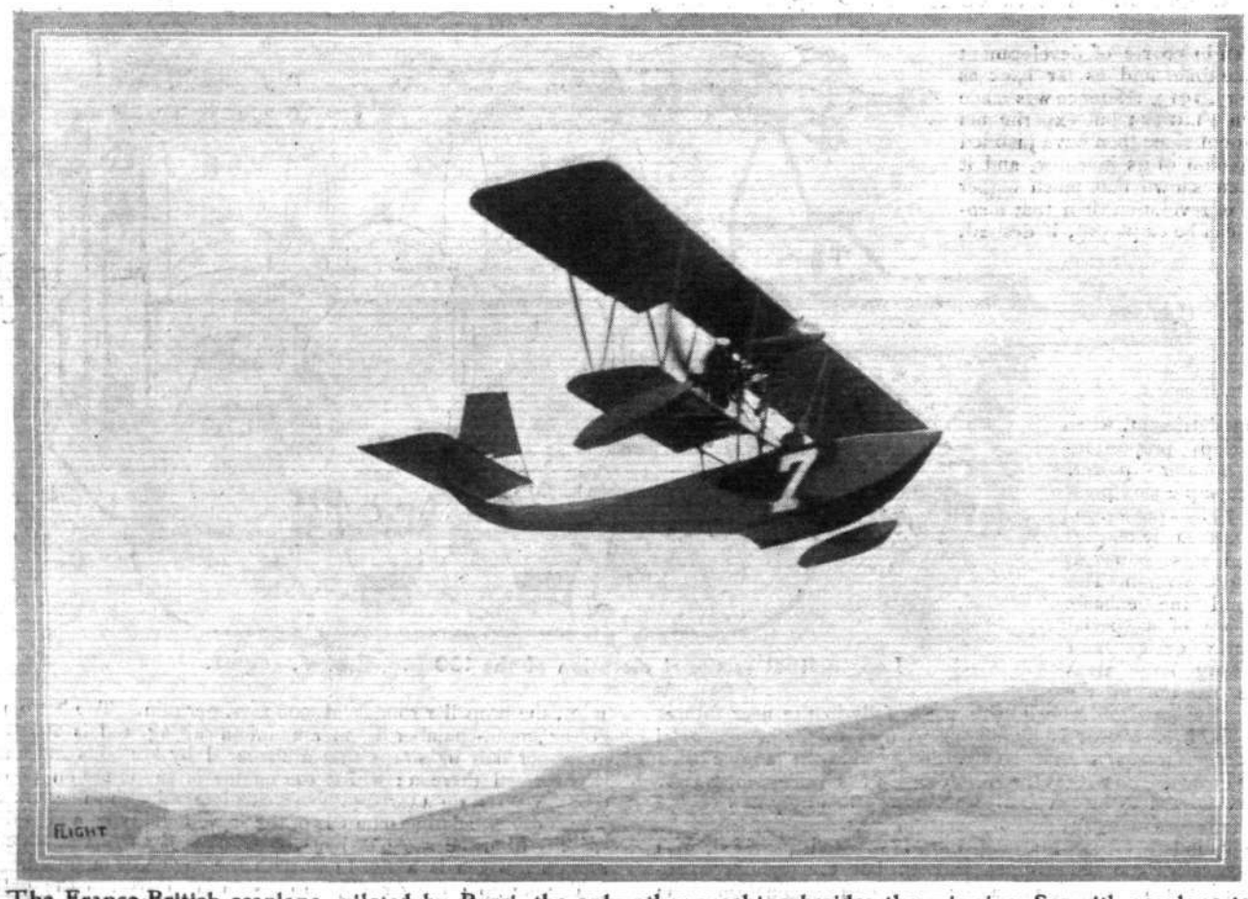
THE following announcement appeared in the *London Gazette* of the 17th inst. :—

R.F.C.—Military Wing.—*Supplementary to regular corps.* Second Lieut. (on probation) Norman C. Spratt is confirmed in his rank.

The following announcements appeared in the *London Gazette* of the 21st inst. :—

R.F.C.—Military Wing.—The date of appointment of Second Lieut. Geoffrey de Havilland to the Reserve is antedated to November 24th, 1912.

Second Lieut. Norman C. Spratt, Special Reserve, is appointed to the Reserve. Dated March 25th, 1914.



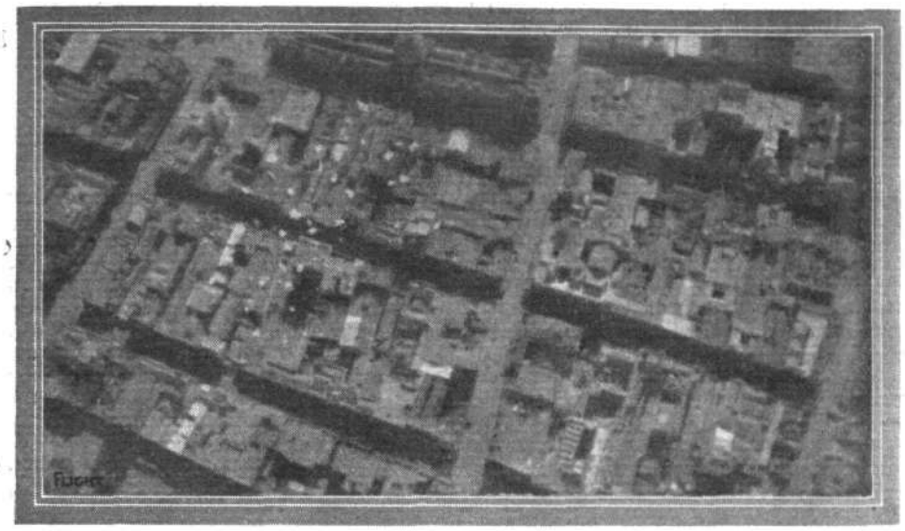
The Franco-British seaplane, piloted by Burri, the only other machine besides the winning Sopwith seaplane to finish the course for the Schneider Cup at Monaco.

FLIGHT

FOREIGN AIRCRAFT NEWS.

Long Flights in France.

Rost on his Deperdussin-Gnome, and Poulet on a Caudron-Rhone on the 15th inst. set out to try and beat the duration record of 16 hrs. 20 mins. made by Ingold. They flew over a course between Etampes and Arthenay, but both pilots were much troubled by the wind and Rost gave up after covering 400 kiloms. in 4 hrs. 0 mins. 44 secs., while Poulet had to come down after a flight of six hours' duration. Another attempt was made by Poulet on Sunday last, but again he had to give up after being in the air for six hours.



A photograph taken from 1,500 ft. by Capt. Penfold, the Australian aeronaut-aviator, during a voyage in the air across Sydney city. At the top of the picture is Queen Victoria Market, and the streets are, running from bottom to top, (left) Park Street and (right) Market Street. Across the picture are George Street, Pitt Street and Castlereagh Street.

Buc to Vichy on a Blériot.

ON his Blériot monoplane, which is fitted with an 80 h.p. Rhone motor, Baron Pasquier on the 17th inst. flew from Buc to Vichy, with a stop on the way at Nevers.

On Sunday Baron Pasquier flew back to Buc.

Three Hours' Flight on a Nieuport.

ON a Nieuport machine, the Italian Capt. Piccio, on the 7th inst., flew from Busto to Padova, a distance of 280 kiloms. in three hours, while on the following day he made the return journey *via* Piacenza, a distance of 340 kiloms. On the 9th, Lieut. Tacchini, also on a Nieuport, flew from Busto to Bologna and back, taking six hours for the trip of 470 kiloms., including a stop of half an hour at Bologna. Lieut. Waldimico also flew from Busto to Turin and back, a round trip of 250 kiloms.

Touring by Aeroplane.

ON the 14th inst. the Marquis de Larienty-Tholozan started from Buc on his De Dion-engined M. Farman, and with a passenger flew to Mans in two hours. Later he went on to Laval and Blain, and eventually returned to Buc. On the same day Maurice Farman took his brother Dick from Buc to Etampes and they then made a long flight along the Loire valley, stopping for lunch at Chambord. They subsequently returned to Buc *via* Chateaudun, Tillieres and Dreux after a trip which totalled to more than 400 kiloms.

The Collision at Buc.

THE smash at Buc on Sunday afternoon was one of the most terrible in the annals of aviation. Since the first demonstration of looping the loop by Pegoud the Blériot aerodrome at Buc has become increasingly popular as a Sunday afternoon rendezvous for Parisians, and latterly, to add to the interest, races have been arranged. During such a race on Sunday afternoon Deroye and Bidot were having a keen tussle for the lead, and at one of the turns Bidot attempted to pass above Deroye. The chassis of his machine touched the tail of Deroye's monoplane, and both were immediately thrown out of control and crashed to the ground. Deroye and his passenger, M. Albin, were killed in the fall, while Bidot and his passenger, M. Pelado, were terribly injured. The wrecks of both machines burst into flames, and while in the case of Bidot's machine the fire was quickly put out, that of Deroye was reduced to a heap of cinders, while the bodies of the unfortunate pilot and passenger were also considerably burned.

Night Flights on a Savary.

ON a Savary biplane fitted with a 100 h.p. Anzani engine, Frantz, on the 14th inst., with two passengers, flew from 11 p.m. to midnight, passing several times over the town of Chartres.

Aeroplanes on New French Stamps.

IT is announced from Paris that it has been decided that there is to be a new design for the French postage stamps. It is understood that the chief features of it will be a view of the Eiffel Tower with an aeroplane flying past.

Gibert Joins the Loopers.

ON the 14th inst., Gibert, on a small monoplane of his own design, succeeded in looping the loop three times, and also made two short straight flights upside down.

805-Mile Flight in Germany.

STARTING from Konigsberg at 5.10 a.m. on Monday morning, Lieut. Geyer, accompanied by Lieut. Mikulski flew to the Johannisthal aerodrome, and after a short stop went on to Mulhausen. From there they flew to Strasburg, arriving at 8.5 p.m., so that the total distance flown during the day was 805 miles, and the average flying speed worked out to 72 miles an hour.

To Tax Aviators in Germany.

IT is stated that the German Foreign Minister is at present considering a proposal to impose a tax of probably 100 marks on all aviators visiting Germany, irrespective of whether they arrive on an aeroplane or by any other means.

Another snap taken by Capt. Penfold above Sydney from the same position and at the same time, but with another camera, as the other photograph. Note Sydney Railway Station in the centre of this picture.

Flying in German Colonies.

A FLYING ground which will be utilised chiefly for military purposes has been formed at Karibib in German South West Africa. Tests will shortly be made by the Government with a view to demonstrating the possibility of using aeroplanes for the transport of medical men and mails in the Colony.

Ehrmann Killed while Looping.

APPARENTLY over-confidence was the cause of the fatal accident to the Algerian aviator Ehrmann while flying at the Allelik aerodrome at Bone, Algeria, on Saturday. He had looped the loop at a height of 1,000 metres and had flown upside down at a height of 300 metres in front of the Grand Stand. Then another loop was attempted, but the pilot failed to allow sufficient distance from the ground. The machine fell, and in the smash the pilot was terribly injured and died immediately.

A Race in China.

OVER a 130 kilom. course from Pekin to Pao-Ting-Fou four Chinese aviators on Caudron machines took part in a race on the 13th inst. Although the name of the winner is not given it is stated that he completed the course in 50 min.

⊛ ⊛

BRITISH NOTES

A "Wight" Seaplane for the Navy.

IT is gratifying to record the splendid progress which is being made by British manufacturers such as Messrs. J. Samuel White and Co., Ltd., whose aviation department is under the charge of Mr. Howard T. Wright, in the construction of machines capable of fulfilling the arduous requirements of the Navy. On several occasions recently we have referred to the remarkable performances of the Wight seaplanes built by this firm, and on Wednesday of last week, a sister ship to the "Wight" which was so much admired at Olympia, went through her official tests in fine style. Fully loaded with fuel for four hours' flight, wireless telegraphy apparatus, and pilot and passenger, she climbed 3,000 ft. in 7½ minutes. Her speed according to the indicator was 75 miles an hour, and she leaves the water in from 5 to 7 seconds from opening out the motor. The final hour's flight was carried out without incident.

Parseval Airship Visits Dover.

DOVER had a sight of the Naval Parseval airship on Tuesday. It had cruised over from Farnborough, and returned *via* Maidstone and Chatham, having covered nearly 200 miles in seven hours.

Sydney Pickles Flying Again.

IT will be seen from our Eastchurch notes on p. 437, that Mr. Sydney Pickles has again commenced active flying with his 60 h.p. Anzani-engined Blériot-type monoplane. On Wednesday he started from Eastchurch intending to fly to Hendon, but after covering 35 miles he ran into a thunderstorm and turned back. He covered the 70 miles in as many minutes, while the greatest height attained was 3,000 ft. Although he does not intend to re-enter the ranks of professional airmen, Mr. Pickles promises to do a good deal of amateur flying.

Mr. Blackburn at Harrogate.

THE weather being very favourable last week, Mr. Harold Blackburn made many passenger flights at Harrogate, including many lady passengers, on his 80 h.p. Blackburn monoplane. On Saturday he flew, with Dr. Christie as passenger, to Ripon, and in the evening flew to Saltburn for the week-end.

Mr. Hewitt at Rhyl.

ON Monday Mr. Vivian Hewitt, on his rebuilt Blériot, flew over to Rhuddlan about five miles away and gave an exhibition over the point to point races in very gusty weather. He returned to Rhyl later and when over the sands the engine started missing so badly that it became necessary to land. After fitting another plug a re-start was made by the aid of the release clip and a length of rope which is always carried on the machine, from the breakwater.

On Tuesday Mr. Hewitt made a flight of 1½ hrs. over Rhyl and then on to Prestatyn, where an exhibition was given, then on to Point of Air, Flint, and across the mouth of the river Dee to Hoylake. Then back to Rhyl and on to Abergele and Pensarn, finally landing at the Aerodrome, Foryd, after a trip of 1½ hrs.

Caudrons in Great Britain.

NOW that Mr. W. H. Ewen is no longer connected with the firm, it has been decided to change the name of the W. H. Ewen Aviation Co., Ltd., to the British Caudron Co., Ltd. The business will continue to be under the management of Mr. Ramsay and Mr. Hunter.

Bristols Leave Salisbury Plain.

SEVERAL times the British and Colonial Aeroplane Co., Ltd., have had to temporarily close down their school at Lark Hill on Salisbury Plain, and now it is to be transferred definitely to Brooklands, as the ground used by the Bristol school on Salisbury Plain is required for artillery ranges. The concentration of the Bristol flying activities at Brooklands should make the work to be seen there more interesting than ever.

Good Work by the "Eugene Montgolfier."

WITH ten persons on board, the Clement-Bayard dirigible, "Eugene Montgolfier," on the 14th inst., cruised from her station at Maubeuge to Paris in three and a half hours, a landing being effected at Issy. On Monday morning a two-hour trip was made with ten persons on board, while another long voyage with eleven on board was made late in the afternoon.

A New Zeppelin on Trial.

ON the 16th inst. the new Zeppelin "LZ 23" cruised from Friedrichshafen to Badenhof, and was then taken over by the German military authorities. In future she will be designated "Z 8," and will be stationed provisionally at Dusseldorf. On Monday, the dirigible went from Leipzig to Oos, a voyage of 400 kiloms.

⊛ ⊛

OF THE WEEK.

Practical Experience.

THERE has been no lack of books produced upon the subject of aviation, but practically all of them deal either with the history or the theory of the flying machine, and practically no attention has been given to the actual business of handling aeroplanes in the air. This side of flying has however now been adequately dealt with in a book entitled "Flying—Some Practical Experiences," in the writing of which Messrs. Gustav Hamel and Charles C. Turner have collaborated. It is a book which all those who "are thinking of taking up aviation" will do well, not only to get but to thoroughly study it pages. As indicating the scope of the book, it may be useful to mention that the subjects dealt with include: Aptitude for flying, the aviator's first lesson, cross-country flying, choosing a machine, weather, winds, eddies, and other disturbances, high flying, oversea flying, the aeroplane in war, photography. Not only have the authors drawn largely from their own unique experiences, but they have also received material assistance from Mr. Henry Farman, Mr. Alec Ogilvie, Mr. Howard Wright, &c., while the Hon. G. Marconi contributes some notes on wireless telegraphy, and at the end of the book there is a very informative chapter on the physiological medical aspects of aviation. The book is very well illustrated by photographs, and special care has been taken to select pictures that specially illustrate the various aspects of flying dealt with in the various chapters. The book is published by Longmans, Green and Co., at 12*s.* 6*d.* net.

A Book about "Emaillite."

ALTHOUGH it does not always receive the attention it warrants, the "dope" is a most important factor in aeroplane construction. Those who are interested in the matter should not fail to secure from the British Emaillite Co., Ltd., 30, Regent Street, S.W., a copy of the book they have just published and which is full of instructive facts and figures, and is withal illustrated by a unique series of photographs of modern machines doped with Emaillite.

"Come Inside."

THOSE who have to do with the organisation of flying meetings know how serious is the problem of dealing with those "deadheads" who prefer to see the show from outside the fence. A novel method is being tried at Hendon. A little booklet has been prepared giving a number of illustrations taken from the sixpenny and other enclosures and showing incidents which cannot be seen from outside. This little book which has its title, "Inside the aerodrome—for Sixpence" boldly displayed on the front, is distributed among those people who take up their position outside the aerodrome, and that it has not been without effect is shown by the fact that during the Easter holidays over 150,000 people passed the turnstiles—a record for the aerodrome.

⊛ ⊛ ⊛ ⊛

AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

1. **Elections.**—Assoc. member: Alfred Curtis. Foreign members: Prof. J. G. Rodger and Th. D. Rodger.

2. **Council.**—Mr. Archibald R. Low has been co-opted to fill the vacancy on the Council caused by the retirement of Mr. J. W. Dunne therefrom.

3. **Meeting.**—The twelfth meeting of the present session will be held on Wednesday, May 6th, at 8.30 p.m., when Dr. A. P. Thurston will read a paper, to be followed by a discussion, on "The Measurement of Air Speed."

B. G. COOPER, Secretary.

FLIGHT

CORRESPONDENCE.

Climbing.

[1854] After reading Mr. B. C. Hucks' excellent paper in your issue of April 11th, I had expected to see some correspondence on the question raised by Mr. Mervyn O'Gorman as to whether a machine climbs better against than with a wind. But since there was none, perhaps some of your readers may find the following remarks of interest.

Mr. Hucks considers that the custom of rising head to wind is merely due to an illusion; but it seems to me that it is all a question of propeller efficiency at high speeds. When a machine rises head to wind, it is still travelling at its proper air-speed; but when it rises with the wind, the machine does not travel at its correct air-speed, and so the propeller is not so efficient as at the slower speed. For example, a machine whose normal flying speed is 60 m.p.h., when rising against a wind of 40 m.p.h., is still travelling at a speed of 60 m.p.h., relative to the air. But when rising with the wind, the machine will not reach 100 m.p.h., because at the higher air-speed the propeller is not working efficiently; thus the machine will not climb as well as at the lower speed.

Of course, the difference in efficiency would be scarcely noticeable with low winds, but in a high wind rising against the wind must be more rapid.

Hoping that these few notes may be of interest to some of your readers.

Luton. ——— ALFRED M. COATE.

Wood in Aircraft.

[1855] The letter of Mr. Alexander L. Howard challenges comment. His main point or "theory" is, that timber in an aircraft owing to "exposure to climatic change" and to "the intense speed at which it is driven through the air . . . . suffers from exactly the same fatigue without the recuperative power which the human being possesses." He asks whether the aeroplane builders have considered the point.

Your correspondent can be assured that aircraft builders have considered the possibility of fatigue, in the mechanical sense of the word, in all structural materials used in aeronautical engineering. The human-like fatigue in wood was not known to exist. The known superiority of seasoned wood over metals with respect to (mechanical) fatigue is one reason why the general substitution of steel for timber in aircraft has been deferred.

One does not need to be an aeronautical engineer to realise that Mr. Howard's apprehensions are practically baseless.

First with regard to climatic change. The statement that "*fresh* timber" stowed in the hold of a hot ship may become affected with fungus is true and irrelevant.

If one *has* to compare wood with human beings, one may point out that through exposure to glare from a furnace men may become afflicted with blindness; but such afflicted men will not be urged to become pilots. Aeronautical engineers do not use fresh timber showing fungus; further, such defective timber if put aside to season is readily recognised at each of its stages towards decay by the experienced timber merchant; and if by accident it is sent in to aeronautical firms the defect is promptly discovered by experienced woodworkers. Fungus and woodworkers existed before aircraft.

The smallness of the sections used in aviation work is an additional help in discovering any defects in wood. Any aeronautical firm will agree that construction of aeroplanes does not suffer from lack of independent inspection. There is no excuse for defective timber being used in aeroplanes. Discussion is thus narrowed to general properties of sound wood used.

The assertion that thoroughly seasoned timber in a damp atmosphere will absorb damp and expand does not carry us far. Aeronautical engineers require quantitative data. Amount of possible absorption depends on the kind of wood, but use of appropriate varnishes and "dope" covering the wood and filling the pores reduces the inconvenience to vanishing point. In any event the question to be answered would appear to be whether the varnished timber used in aircraft shows signs of being adversely affected by moisture to a degree importing danger to the structure. The answer is one for an engineer to make after verifiable and adequate tests, and not for suppliers of raw material to decide *ex cathedra* or even in holy conclave.

The statement that "timber placed in the heat of the sun will crack sometimes with a report like the firing of a gun" is misleading. Seasoned timber built into aircraft in this climate does not go off pop.

That imported timber (not of the kind used in aircraft) occasionally has suddenly cracked in our climate, in the process of seasoning, does not warrant any inference that there are dangers arising from the use of seasoned timber of a different kind appropriately varnished and built into aircraft. One might as well argue that because some young English soldiers have sunstroke in Hong Kong, acclimatised Melanesians are peculiarly liable to suffer from heat.

Having dealt with some of your correspondent's generalities as to timber (a subject in which generalities are peculiarly misleading), let us look into these terrible climatic conditions.

His bugbear is change. Are aircraft exposed to much greater climatic changes than other important structures in which wood is used? In the all-air route to Monaco from London is there greater fluctuation in temperature than in the sea and land route? Are yachts and motor boats immune from exposure to damp and changes of temperature? If not, why are they built of wood? Is it safe to risk the timber in a yacht in the heat of the sun going off "with a report like the firing of a gun"? The air pilot can within limits regulate his temperature, the terrestrial scorcher has to put up with what he finds.

The fear—not resulting from experience—that extreme frost will have a sudden effect on wood does not seem well founded. It is presumably the moisture in the wood that is going to solidify and "bust." But why should extreme frost be worse than a uniform temperature of, say, zero? No further expansion takes place. Seasoned and properly protected timber will stand as much climatic change as the seasoned and properly protected pilot.

Next with regard to speed.—Your correspondent seems to assert "'tis the pace that kills." His theory is that as the outcome of the "intense speed" "timber suffers from exactly the same fatigue without the recuperative power the human being possesses." What sympathy pilots should have for their dumb struts and spars who suffering equally with them the fatigue of each trip are hopelessly doomed to retain and accumulate fatigue while the lucky pilot recuperates, nay, becomes less liable to fatigue after each experience.

Aviation is to bring forth unsuspected fruit—The Psycho-Physics of wood. If it is pure speed which causes this new fatigue then the wooden pipe resting quietly in the passenger's pocket suffers this human-like fatigue equally with the main spar; and the brace button if made of metal does not tire, but if made of wood each trip rushes it on to inevitable doom through accumulated fatigue.

On this new theory of fatigue a pilot and his brother wood flying at 100 miles per hour in calm air is much fatigued while one just able to do 15 miles per hour against a mighty wind would keep fresh for a long time, and cause less fatigue to his wood.

So long as this human-like fatigue does not manifest itself under the guise of diminished tensile strength or some other physical property with verifiable references engineers will be content to grant timber in warplanes the privilege of a true son of Mars "to suffer and be strong."

The tip of a 9 ft. propeller at 1,200 r.p.m. is flying round at about the rate of 360 miles per hour independent of its forward movement, *i.e.*, at a speed of three to four times as fast as the "intense speed" which causes such alarm.

Now this vital wooden part of an aeroplane is shaped in such a way as to make it extremely sensitive to physical effects; it is subject to all the ills the other wooden parts of the machine are liable to, and has a few special ones of its own. Here is a field of research for your correspondent without waiting for accidents.

With regard to investigations of accidents, excellent and authoritative committees already exist equipped with members who have no commercial axes to grind, some of whom combine a knowledge of engineering and aeronautical design, with practical experience in wood work and metal work.

An aeroplane is not a collection of stores to be sorted over by merchants; it should be a compact whole of mutually related parts, and the effect of shock or accident obviously depends not simply on the magnitude of the shock and the virtues of the material but also on the disposition and bracing of the parts.

A merchant supplying material from which parts are made cannot usefully decide questions of design and distribution of stresses. The function of suppliers of raw material would seem to be to see that good material is supplied when they are fortunate enough to get orders.

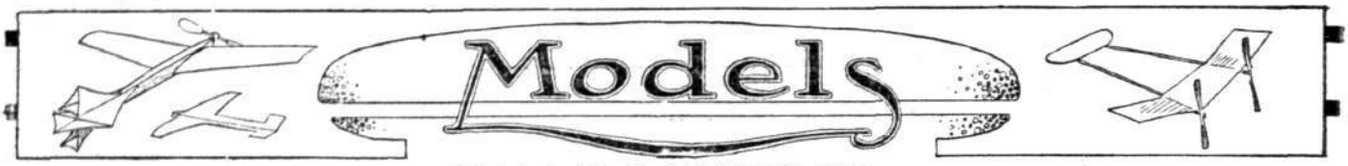
The periodical inspection of aeroplanes in being is already carried out, but far more frequently than at the interval recommended by your correspondent.

Eastmearn Road, West Dulwich. JOHN E. HUSON.
April 22nd.

⊛ ⊛ ⊛ ⊛

Armstrong, Whitworth and Co. and Aeronautics.

SPEAKING at the annual meeting of Messrs. Sir W. G. Armstrong, Whitworth and Co., last week, Sir Andrew Noble said that the development of the aviation department was proceeding satisfactorily on the estate which the company had acquired at Selby. Aeroplanes were being built temporarily at Gosforth, until the directors could remove the manufacture to Selby, where the company had a fine flying ground.



Edited by V. E. JOHNSON, M.A.

Some Further Suggestions for this Season's Competitions.

AT the annual general meeting of the Kite and Model Aeroplane Association, held at Caxton Hall on April 16th, the greater part of the time was devoted to suggestions and discussion relative to competitions for the present year.

Although every possible facility was given to members both before and at the meeting to bring forward such, it cannot, we are afraid, be said that the result was so fruitful as one had hoped. It is, of course, the easiest possible thing in the world to pull to pieces any suggestions put forward, and this well-known fact very possibly kept some tongues silent during the meeting, which wagged quite strongly before and after.

It is unfortunate if anyone who has any idea for a competition should not bring it forward, no matter in however crude a form. *That* can be soon licked into shape, and it is not so very unfrequent that some suggestions, which at first sight may be greeted almost with ridicule, later on suitably modified will be found to contain within them the elements of something really good.

A proposal brought forward by Mr. W. E. Evans (Hon. Sec. Paddington and District Aero Club) for machines without separate tails or elevators, No. 7 of last week's issue, appeared to meet with general approval.

Mr. A. P. Clark (Hon. Sec. South-Eastern Model Aero Club) in a letter called attention to the lack of experiments with tractor models fitted with *twin* propellers. In the discussion which followed, the general opinion was that this could probably be met if in tractor competitions those entering were not limited to the use of one propeller.

From a conversation which we had with several members after the meeting, there seems to be a general opinion that the single-propeller model tractor is a better flying machine than the one with twin propellers, owing mainly to the excessive slip stream of the two propellers, which cause the model to climb very rapidly, and as the power falls off to then dive.

Another point referred to was the cross streams caused by the two propellers, if they revolved, as they usually do, at a slight angle of inclination to one another. The writer can claim only a slight practical acquaintance with twin-propeller tractors. But a model in which the two propellers were small flew very successfully, but it did not, of course, make a very long duration. Although difficult, we assume the problem can be solved quite successfully, and we certainly hope to see the subject experimented with this season.

Several suggestions and proposals, with remarks thereon, were sent in by Mr. R. V. Tivy (hon. sec. Mod. Sec. Bristol Aero Club), which we publish *in extenso* below. These were communicated separately to the writers as well. Mr. A. F. Houlberg said that what pilots wanted at the present time was a machine which was normally subject to personal control, and not necessarily automatically or inherently stable, but which could be rendered so at will, for purposes, say, of ascent and descent, and that he thought something could be done to assist such an aim by experiments with models. He did not, however, put forward any practical suggestions for the carrying out of the same. A model which would rise normally, then perform some unstable or abnormal evolutions in the air and then glide correctly to earth, appears to us to fulfil to some extent at any rate the required conditions.

Mr. J. Dollittle desired to see the introduction of a formula into competitions, so that single propeller and twin propeller machines could meet on equal terms. As one who, in the past, has unfortunately had some considerable experience with reference to judging such competitions, the writer cannot recommend them. At present, we are afraid, they satisfy no one, neither competitors nor judges.

Mr. D. Stanger referred to the question of Ornithopter competitions, but, from what Mr. Akehurst said, we conclude the prize will not be offered again, and indeed as a definite competition prize one can hardly expect it. But, it does not appear to us to be unreasonable to suggest that it should be again offered, permanently, as it were, for the first who at any time before a certain number of official observers, succeeds in accomplishing a certain specified result. Several of those present at the meeting deplored the general absence of biplane models at Olympia and in model competitions generally. We quite agree with this view, and think one or two competitions might be restricted to this class. Another suggestion made after the meeting was for a helicopter competition. This has been proposed by the writer more than once, but has never yet been carried through. Many arguments can, of course, be brought forward against it; but such a competition would undoubtedly be full of interest.

The question of geared motors was brought forward by Mr. F. Mayer, with a view to shortening the *fuselage* and concentrating the weight. Mr. Stanger also referred to the subject as well as others, and the proposal was quite favourably received. We are quite sure, *with our present knowledge*, much could now be done with such. Another point discussed was the question of the covered-in *fuselage* Canard type model. If a competition is arranged for such a type, we believe from what was said that it would be well patronised. Quite a number of such appear to have been flown with considerable success.

Aero Models at Olympia and Future Competitions.

By R. V. TIVY.

At the recent Aero Show at Olympia I had an opportunity of seeing a very representative collection of model aeroplanes. I was particularly struck by the extraordinary difference between the full-size machines exhibited at that exhibition and the models. In the matter of design, the model aeroplanes of 1914 are quite unlike the aeroplanes of 1914, and the difference is not, in most cases, I am sorry to say, attributable to the models being any improvement on their prototypes.

The value of models as experimental apparatus depends entirely upon their relationship to full-size machines. The ideal procedure is to build and fly scale models. It is very difficult, using as a motive power rubber or even any of the power plants available, to obtain flights of *any considerable duration* with models built in their principal dimensions and details to scale. I find, generally speaking, that the models which fly farthest in competitions (while they are, perhaps, the best constructed models) are those which are least like full-size machines. Therefore, long distance and long duration of flight must not be put at a premium if we are going to have our models something like our full-size machines (as I hope we are). If we cannot have an entire aeroplane in miniature, let us at least use in conjunction as many parts of an aeroplane as we can.

Something of the nature of a competition seems to be necessary to keep the interest alive. We want this year to devise competitions which will (A) be the means of improving the trend of model design and (B) induce the competitors to undertake definite and useful experiments. The carrying out of these two objects will raise the status of model flying.

I have received various suggestions from members of our model section for competitions to be held this year, and these will be considered by my committee at the next meeting. To these suggestions I should like to add whatever forms of competition the London clubs decide to adopt. As I remarked at the meeting of the Secretaries' Guild, I consider that it is desirable that the various clubs should be doing something like the same kind of work all over the country. I have divided the suggestions received having regard to their essential objects into the two classes (A) and (B) mentioned above.

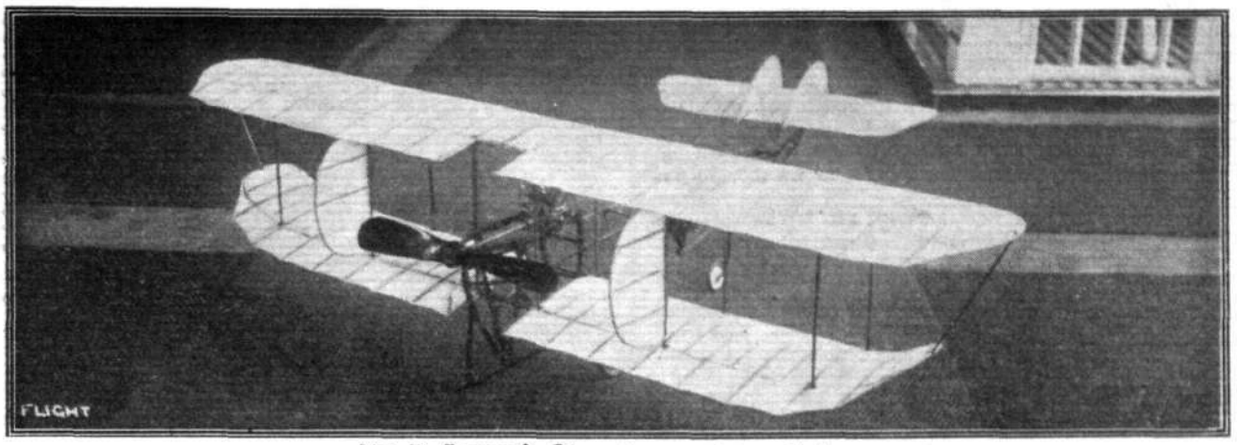
A. *Competitions which are to be the means of improving the trend of model design.*

1. Contest for models having enclosed bodies.
2. Contest for single screw models.
3. Contest for tractor models.

B. *Competitions which will induce the competitors to undertake definite and useful experiments.*

4. Single plane contest (for aeroplanes carrying no forward elevator or tail).
5. Straight flying contest.
6. Variable speed contest (for the greatest variation in speed). In this event the stability of the models when flying slowly can be compared with their stability when flying fast.
7. Quick get-off contest (the mean of the distances in feet with and against the wind to be taken and divided by the effective spread in feet of the wings of the model).

In order that object (A) may be carried out I suggest that wherever possible the models be judged on the following system:—"A minimum distance (of say 100 yards) *or* a minimum duration (of say 15 seconds) shall be fixed. Beyond this minimum no account shall be taken of the distance or duration flown. That marks be awarded for design, construction and flying." The method of awarding marks for flying will depend upon the particular contest in question. For instance, in contests (1), (2) and

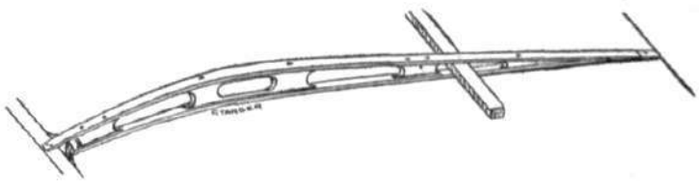


Mr. D. Stanger's Olympia canard type biplane.

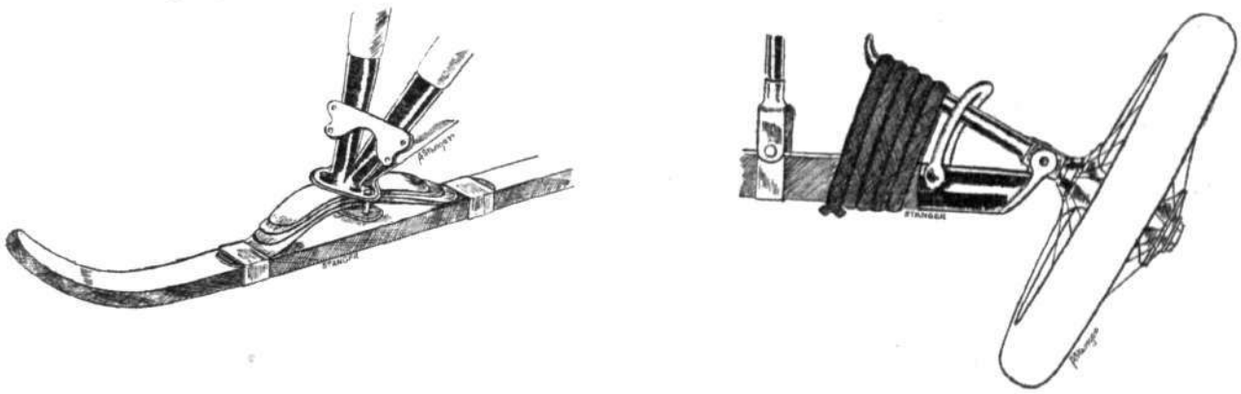
(3) above, marks would be awarded for rising, stability, directional control, landing and any other points which are desirable in a full-size machine. The flying of each model would in this case be judged by two or more judges; one marking the rising and landing (separately) and another the stability and directional control. The awarding of the marks is not necessarily a difficult matter. If the maximum for directional control is 20 marks, the marks awarded would be 20, 15, 10, 5 or 0.

It may be thought that such a system as this would be too complicated to work satisfactorily in practice. This has not been our experience. I enclose a programme of one of our most successful competitions which was judged in this way, the number of models competing being as many as 55. A great deal depends upon the judges. We in Bristol have been very fortunate in securing competent and impartial judges. I have no doubt that the London clubs are equally fortunate.

encourage experimental work and develop the right kind of models. The influence of competitions on the science of model aviation is very considerable. We must make it our business to see that this influence is directed into the right channels.



Ribs on Mr. D. Stanger's biplane.

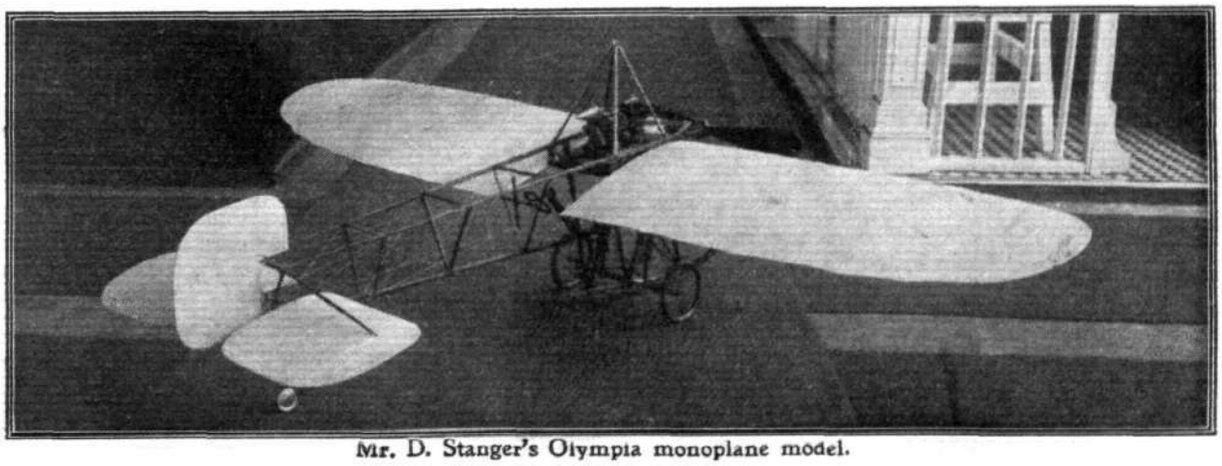


MR. D. STANGER'S MODELS.—On left, monoplane skid; on the right, non-buckling wheels on mono. and on biplane.

I think you will agree with me that the time has now come when we should consider more seriously than we have hitherto, not so much what form of competition is easiest to judge, nor what form of competition will attract most entries, but what competition will

Mr. D. Stanger's Olympia Models.

We have much pleasure in publishing the accompanying photographs, drawings and particulars of these models, which aroused so much attention at the Show. The machine most fancied was, we



Mr. D. Stanger's Olympia monoplane model.

believe, the Canard-type biplane, and this certainly gave the best account of itself in the original flying tests at Hendon; and in the reflown contest made a splendid flight of some 50 secs. at the first attempt, rising off rough ground. Mr. Stanger informs us that this machine did not injure itself whilst taxi-ing along the ground, but at the end of its first flight, the second official trial, and that the 23 secs. flight referred to, was the second and not the first flight in the three trials allowed, as we thought was the case.

Tractor Monoplane.—Span, 10 ft.; chord, 2 ft. Wings rounded at the tips, cambered and double surfaced. Lifting tail. The planes, tail, &c., are covered with a special silk-faced fabric, and doped with standard Cellon.

The *fuselage* is of triangular section, strongly braced with piano wire (breaking strain 300 lbs.) and steel angle-plates. The front members of the framework are carried very low down to a point, and fitted to a heavy hickory skid; a strong laminated spring (shown in one of the drawings) is interposed to absorb shock in landing. The floating axle is sprung on rubber shackles (as illustrated), and is fitted with the designer's non-buckling wheel device. The overall length of the machine is 7 ft.

The petrol motor is a Stanger 4-cylinder V-type engine, which drives a propeller of 30 in. diameter and 22 in. pitch at 1,600 r.p.m. giving a thrust of 14 lbs. Flying speed of the model about 30 miles an hour. Weight of engine, including petrol, oil tanks and pump, 5·25 lbs. Weight of machine in flying order, 20 lbs. The machine has made a number of very good flights.

The Canard Type Biplane.—This machine, as can be seen from the photograph, is a Canard biplane, of which the lower plane has upturned wing tips for lateral stability. The machine is also fitted with four vertical fins, two on the top of the elevator and two between the main planes. The span of the machine is 7 ft., the chord 1 ft., and the gap 13 ins. The elevator span is 30 ins., and the chord 8 ins. The total length of the machine is 4 ft. 2 ins. The *fuselage* is of triangular section, and strongly braced with piano wire—breaking strain, 250 lbs.—and steel angle plates. All bolt holes are strengthened with steel plates. A landing chassis is entirely eliminated, as the *fuselage* is carried very low down, thereby forming a very low skid. The machine is very finely sprung on double helical steel springs, and the floating axle is fitted with wheels fitted with the designer's non-buckling device. Forward of the *fuselage* is fitted a kangaroo skid, hinged on a strong universal joint, and sprung with rubber. The engine (petrol) is a Stanger 2-cylinder V-type, which drives a 22-in. diam. propeller of 18-in. pitch at 2,000 r.p.m., and gives a steady thrust of 9 lbs. The flying speed is about 20 miles an hour. Weight of engine, 2 lbs. 12 ozs. Weight of machine in flying order, 10¾ lbs.

KITE AND MODEL AEROPLANE ASSOCIATION

Official Notices.

British Model Records.

Single screw, hand-launched	Duration ...	D. Driver...	...	85 secs.
Twin screw, do.	Distance ...	R. Lucas ...	...	590 yards.
	Duration ...	G. Hayden	...	137 secs.
Single screw, rise off ground	Distance ...	W. E. Evans	...	290 yards.
	Duration ...	W. E. Evans	...	64 secs.
Twin screw, do.	Distance ...	L. H. Slatter	...	365 yards.
	Duration ...	J. E. Louch	...	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance ...	C. C. Dutton	...	266 yards.
	Duration ...	J. E. Louch	...	91 secs.
Do., off-ground	Distance ...	C. C. Dutton	...	190 yards.
	Duration ...	J. E. Louch	...	94 secs.
Single screw hydro., off-water	Duration ...	L. H. Slatter	...	35 secs.
Single-tractor, do., do. ...	Duration ...	C. C. Dutton	...	29 secs.
Twin screw, do., do. ...	Duration ...	L. H. Slatter	...	60 secs.
Engine driven off grass ...	Duration ...	D. Stanger	...	51 secs.

Annual General Meeting.—The annual general meeting of the Association was held at Caxton Hall, Westminster, on April 16th. Mr. V. E. Johnson, M.A., was elected to the chair for the evening. The officers elected to serve for the ensuing year were:—*President*—The Right Hon. the Earl of Lonsdale. *Vice-Presidents*—Mr. R. M. Balston, Col. J. D. Fullerton, R.E. (Ret.), Mr. B. C. Hucks, Sir Bryan Leighton, Bart., Mr. J. T. C. Moore-Brabazon and Sir Archibald Sinclair, Bart. *Advisory Council*—Messrs. H. G. Bond, W. B. Brooke, H. W. Browse, T. W. K. Clarke, Herbert Chatley, C. R. Fairey, H. H. Groves, G. Gildea, T. O'B. Hubbard, L. Ingram, A. W. Howkins, V. E. Johnson, R. H. Lanchester, J. H. Ledeboer, M.A., F. Mayer, W. H. Norton, F. T. Pringuer, G. Rowlands, G. P. Bragg-Smith, Dr. Thurston, D.Sc., and H. R. Weston. *Chairman of Research Committee*—Dr. A. P. Thurston, D.Sc., A.F.Ae.S. *General Hon. Sec.*—W. H. Akehurst. *Kite Hon. Sec.*—R. H. Lanchester. *Kite Assistant Hon. Sec.*—L. Ingram. *Model Hon. Sec.*—J. H. Lyche. *Model Assistant Hon. Sec.*—A. F. Houlberg. The report and balance-sheet for the year was passed as read. The new President, Lord Lonsdale, was unable to be present, but sent a message stating that he would endeavour to make his year of office a success and that he would do his utmost to help the Council in raising the sum needed for the International Kite and Model Meeting and also for the Volunteer Kite and Wireless Squadron. A vote of thanks was passed to the retiring President, Sir John C. Shelley, and also Lady Shelley for the great interest they had taken in the association during the year. Vote of thanks was passed to all who had subscribed towards the prize fund, also to the hon. secretary for his work during the year. A lengthy discussion was held on suggestions for competitions during the season, and they will be fully considered by the various rule committees. It was decided that the subscription be raised for members from 5*s.* to 6*s.* and that this should include an official badge of the association with the date of year and that all members must wear same at all competitions and meetings; the junior subscription was also increased from 2*s.* 6*d.* to 3*s.* 6*d.* The fellow's subscription of £3 3*s.* and associate fellow's of £1 1*s.* to remain the same, but to include the official badge. A hearty vote of thanks to the chairman, Mr. V. E. Johnson, model editor of FLIGHT, brought the meeting to a close at 10.55.

International Aero Exhibition.—Official trials in Class I for power-driven models for prize offered by the Royal Aero Club was held at Hendon during the week-end. Result was—Mr. D. Stanger with his petrol-driven biplane, 1st, winner of £10, with a splendid flight of 51 secs., the other competitors did not qualify. Mr. Stanger's flight was the finest yet seen in competition in this country, it rising well and maintaining a fine stability throughout. This is also a British record, he having applied for same to be observed.

Annual Subscriptions.—Subscriptions are now due and should be forwarded to the hon. sec., as the early payment greatly facilitates the work of the association.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

APRIL 26TH, flying on Wanstead Flats, 6.30 and 10 a.m.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

APRIL 25TH, sealed handicap for 6-oz. twin-screw r.o.g. models (postponed from last week). Three prizes. Average of three flights. Bronze medals are offered to members for 60 secs. average on any Saturday before June 1st. Models may be either single or twin screw and weigh not less than 6 ozs., loading not under 4 ozs. per sq. ft. Any member making an average of 60 secs. three times will be awarded a silver medal. No member can win more than one medal. Flights in any competitions can count for these medals.

UNAFFILIATED CLUBS.

Dundee Aero Club (4, FORESTER STREET).

SECOND Round Luis Trophy: A r.o.g. competition for the above will be held in Lochee Park, on Saturday, 25th inst. Flying to commence at 3 p.m. Members please note, no trial flights after 3 p.m.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

USUAL flying meetings this week-end. Rules of the fourth "South Eastern Trophy" competition. April–June Quarter, 1914:—1. This competition shall be open to members of the S.E.M.A.C. only, and is for 2. Models of either the tractor or propeller types, capable of rising from the ground entirely under their own power. 3. Models may be either monoplanes or multiplanes, and must weigh, in complete flying order, not less than 6 ozs., nor more than 8 ozs. 4. The minimum loading for monoplanes is 4 ozs. per sq. ft. 5. The minimum loading for multiplanes is 3 ozs. per sq. ft. 6. The motive power may be any suitable means devised by the competitor. 7. The whole model (except wheels and propellers) must be constructed by the entrant. 8. Models must alight on the chassis at the termination of one official flight and remain in a proper upright attitude for a minimum period of 5 mins. 9. At the completion of their official tests models must be in an undamaged condition. 10. The official flights will be held on May 30th and June 27th. Competitors flying on the first date will be given an allowance of 5 per cent. on their marks. 11. Models will be required to start from very short grass, no artificial surface will be provided. 12. Competitors may change, repair or add to their motive power as required. 13. Each model must be fitted with a protector over the motor-rod, such as a wire or cane loop. 14. Competitors pushing or otherwise assisting their models to rise will be disqualified. 15. The winner shall be the competitor who obtains the greatest duration of flight in one of the official tries. 16. If time permits three official flights will be allowed to each competitor on each or both dates. 17. Competitors must be responsible for all damage done by or to their models. 18. The judges will be three non-competitors appointed by the committee. 19. Each competitor may enter any number of models. 20. These rules may be amended or otherwise added to at the discretion of the judges. 21. Entry forms must reach the hon. secretary at least three days previous to the official flying dates.

Aeronautical Patents Published.

Applied for in 1912.

Published April 9th, 1914.

2,540. A. A. HOLLE. Aeroplanes.

Applied for in 1913.

Published April 9th, 1914.

6,974. J. L. GARSED. Flying machines.

7,072. N. LACROTTE. Safety shock-absorbers for seats in aeroplanes.

FLIGHT.

44, ST. MARTIN'S LANE, LONDON, W.C.

Telegraphic address: Truditur, London. Telephone: 1828 Gerrard.

SUBSCRIPTION RATES.

FLIGHT *will be forwarded, post free, at the following rates:—*

UNITED KINGDOM.	s.	d.	ABROAD.	s.	d.
3 Months, Post Free...	3	9	3 Months, Post Free...	5	0
6 ,, ,, ...	7	6	6 ,, ,, ...	10	0
12 ,, ,, ...	15	0	12 ,, ,, ...	20	0

Cheques and Post Office Orders should be made payable to the Proprietors of FLIGHT, 44, St. Martin's Lane, W.C., *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

Should any difficulty be experienced in procuring FLIGHT *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*